The FIRST A Chilton Publication of the First P

What are chances for a pickup in shipbuilding? See page 59

THE NATIONAL METALWORKING WEEKLY . MARCH 17, 1955

THE HEAT'S ON . . .

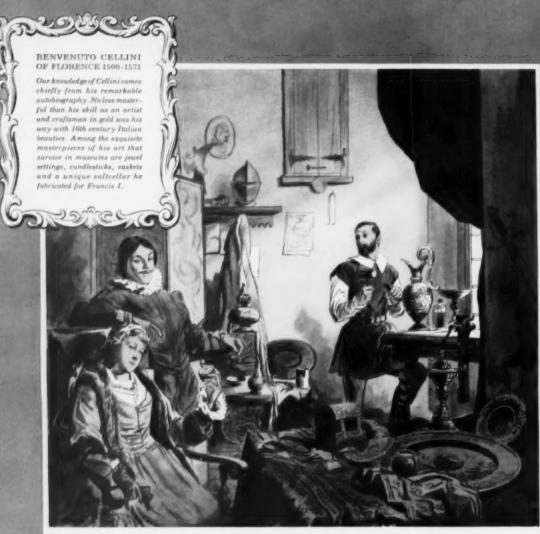
at one of Claymont's completely new soaking pits. Here, the heat is on an ingot until its temperature is uniform throughout and of the proper degree for rolling. It's in the first of many sizes and shapes it will assume before it emerges as a finished, useful Claymont product . . . Carbon or Alloy plate . . . Flanged and Dished Heads ... Manhole Fittings and Covers ... Large Diameter Welded Steel Pipe . . . Stainless-Clad Plate . . . Flame Cut Steel Plate Shapes.

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One of the Roller's responsibilities is to see that every finished bar has the proper size and shape. For that reason you can often find him at the delivery end of the mill, carefully checking bar samples with gauges, calipers or templates, making sure the bars are precisely to customers' specifications.

That same high standard of care, faithfully followed every step of the way, assures you of a mighty good product. So, when you're in the market for hot-rolled carbon bars in standard or special sections, try Bethlehem! Place your order with the Bethlehem sales office nearest you. And, meanwhile, if you'd like a free copy of our booklet, "Guide for Selection of Carbon Steel Bars," just drop a line to our Publications Department, at Bethlehem, Pa.

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BETHLEHEM HOT-ROLLED CARBON BARS

STANDARD SECTIONS . SPECIAL SECTIONS . BAR SIZE SHAPES





DIGEST OF THE WEEK

Vol. 175, No. 31, March 17, 1955

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NEWS DEVELOPMENTS

SHIPYARDS GET \$500 MILLION PROGRAM — P. 59 Government appropriations will stimulate shipbuilding as soon as contracts emerge from Washington. Navy and Maritime Administration funds reach nearly \$500 million for private yards. Program will add new tightness to plate market.

U. 5. NOT READY FOR DEFENSE EMERGENCY—P. 61 Air Force general tells The Iron Age in exclusive interview that it would take a minimum of 2 years to build up aircraft production to meet war needs. Favors use of dual purpose plants with facilities for both defense and civilian production and with enough flexibility to shift to whichever type production is most needed at a given time.

NEW ORE SOURCES BEGIN PRODUCING — P. 62 Investments in Labrador, Steep Rock, South America start paying off. Labrador ore will be a big factor when Seaway goes through. Mesabi will still carry the major load, providing 80 pct of U. S. needs. All Lakes boats start moving north as ice breaks up.

SMALL BUSINESS AWARDS STEPPED UP — P. 64
Ninety pet of the nation's 4 million enterprises are
"small business." A prime function of Small Business Administration is to keep small contractors
abreast of upcoming government procurement needs
for goods and services. All types of firms are included
in SBA's expanding role of contract and loan assistance.

UNITED KINGDOM BOOSTS STEEL PROGRAM — P. 67 British steel expansion program is geared for three-pronged objective: (1) to meet increased domestic needs, (2) to step up exports, (3) to reduce reliance on imports. Planned capacity aimed at 24.6 million ingot tons—maybe more—by 1958. Committments at \$700 million already may reach \$840 million.

TITANIUM NEEDS HELP OVER ROUGH SPOTS—P. 66 Youthful industry needs market development, aid on research in today's market. Orders are at low point despite progress in quality and production. New facilities increase annual output.

NO. 1 SPOT IN INDUSTRY A STAND-OFF — P. 76
Ford and Chevrolet battled to the wire neck and neck.
Both claim victory in dispute over registrations. Ford
says "refined" registrations show it the winner. Chrysler adds new engineering facilities at Highland Park
center.

IN METALWORKING

ENGINEERING & PRODUCTION

WELDING TITANIUM WITHOUT FILLER ROD — P. 99 Welding commercially-pure titanium without filler rod has resulted in joints with characteristics better than those where filler rod is used. Without filler rod, the argon blanket remains unbroken and symmetrical, affording better weld protection. Characteristics are further improved by other modifications. The technique seems practical for titanium alloys.

INCREASE LIFE OF INDUSTRIAL RUBBER HOSE—P. 103
Costly production shutdowns can and often are caused
by accidental hose failure due to accidents, over-stressing and improper use. A better understanding of
industrial rubber hose, its components, the types available and proper maintenance will increase hose life.

CARBIDE PROGRAM CUTS TOOL BREAKAGE — P. 106 Excessive carbide tool breakage is costly, usually stems from accumulated faulty practices. One firm took corrective steps, cut breakage losses 52 pct in four months. Variety of tools on inventory was reduced. Biggest benefits came after training machine operators in efficient carbide practices.

TOOL MACHINES, ASSEMBLES SMALL PARTS—P. 109 Using individual machine tools on secondary operations meant high costs for making windshield wiper motor housings. Five machining operations and one assembly are required. Now one multi-purpose tool performs six operations on this housing at a rate of 1000 parts per hour.

HYDRAULICS OFFER ACCURATE CONTROL — P. 110 Hydraulic systems have shown extraordinary versatility in a host of modern machine applications. Speed, torque and horsepower can be accurately controlled between wide limits. This article describes fundamental hydraulic circuit arrangements which may be used as a guide in designing hydraulic systems.

MARKETS & PRICES

WORLD SCRAP EXPORT BARRIERS LOOM — P. 66 U. S. studies possible restrictions on scrap exports. Serious European shortage has already placed East and West Europe in competition for dwindling supply. Scrap trade favors open end policy unless national emergency arises. Steel industry asks controls.

NEW ORDERS REVIVE WEST COAST AIRCRAFT—P. 85 Substantial new orders placed with aircraft makers keep industry on an even keel. As no. 1 metalworking employer in the West, its welfare has stabilizing effect on area's economy. Boeing may make first jetliner.

STEEL USERS ORDERING FOR THIRD QUARTER — P. 155 Third quarter order volume is growing. This indicates growing confidence of steel consumers that heavy demand for mill products will continue beyond first half. Mounting ingot production is likely to make March a record month. Mills are still fighting the battle of scrap. They are going all-out in an effort to offset scrap price pressure with blast furnace production. Marginal mills firm-up their prices.

DELIVERIES REACH ALL-TIME HIGH MARK — P. 156 For the second straight month, deliveries of steel to automotive industry set all-time record. Only construction and agriculture show decline among major market classifications. Highway, tubular products demand keep market universally strong.

INDUSTRY MAY GET GOVERNMENT ALUMINUM—P. 162
Shortage of aluminum supplies has caused the government to consider diverting metal from its stockpile.
Amount involved rumored to be in the neighborhood of 25,000 tons. Aluminum would come from deliveries scheduled for first and second quarters. Under plan being considered this amount would have to be made up through increased shipments to stockpile during the second half.

NEXT WEEK:

NEW PROCESS RECOVERS IMPURITIES IN COKE GAS Impurities in coke oven gas can now be recovered by a new process which uses waste pickle liquor for the washing treatment. The products normally considered waste are converted to marketable items. Ammonia, hydrogen sulphide and hydrogen cyanide are removed from coke oven gas leaving it at city gas purity.

WHAT ABOUT RUSSIAN PRODUCTION TODAY?

We think of Russian production as operating under rigid controls, with all moves planned and directed from the top. How far off is this picture and how much can we believe of Russian production figures? Some of the answers to these questions are given in next week's story on Soviet industry.





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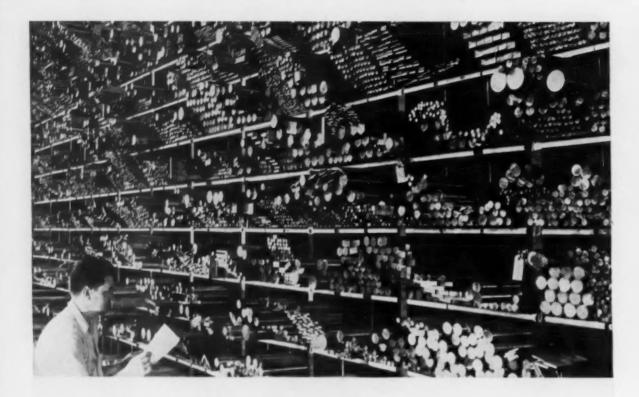
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indexed in the industrial Arts index and the Engineering Index.



Editorial:

What About The Third Quarter?

• PRIVATELY a lot of businessmen are worried about what is going to happen on the economic front during the last half of this year. Probably the "friendly" investigation of the stock markets has added a few wrinkles to this worrying.

Present information and patterns now shaping up on the business horizon give little reason to worry about the last half of this year. But some people who are fairly confident that the fourth quarter of 1955 will be passably good are allowing their economic conscience to bother them when they think about the third quarter. Some of this feeling may stem from the general but hidden attitude, "things are too good to be true."

The best way to get a line on the third quarter of this year is to review last year's pattern for the same period-then apply some of the 1955 factors. The upturn in business really began last April. But the upswing was halted or flattened out by some new conditions which came into the picture during the July quarter of last year.

Last summer there was one of the greatest mass shutdowns for vacations the country has ever seen. These shutdowns were so extensive that many firms which had not intended to close shop had to do so because people they did business with had shut down.

With industrial shutdowns assuming the proportions they did last July and August, production, delivery and sale of all types of raw materials and finished products were off substantially. There was no proper correction in business indexes to take care of this situation; it was a new "economic fringe" pattern. So indexes hit their low points.

Another major factor which fostered a low third quarter last year was inventory reduction. The final stages of that phase were present last year during July, August and part of September.

This year there will be mass vacations just as last year. But the number of plant shutdowns will not be as great because of new order volume. When plants start up after a 1, 2 or 3-week shutdown there is a terrific avalanche of orders which have piled up. There has also been a loss in deliveries in and out of the plant.

This year with attempts at inventory buildup, with full recovery under way and with the international situation touch-and-go, no pattern similar to the 1954 third quarter is probable.

Tom Campbell

7

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Slo-Speed provides the one best, dependable low speed so necessary for the successful operation of our new automatic spinner which increases production of inner spring mattresses 365%, reports Mr. Charles H. Gail, President of Spring Machinery Co., Los Angeles. Slo-Speed drives were selected for their low maintenance, rugged and efficient gear system, positive oil seals and streamlined appearance.

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dear editor:

letters from readers

Tanks and A-Bombs

Sir:

A very interesting article appeared in the Feb. 3 issue of your journal, giving some particulars of an elevated tank design to withstand high blast effects.

We note that in this article reference is made to a report published by the United States Atomic Energy Commission, and we would be glad if you could advise us whether it is possible to obtain a copy of the report in this country. If not, could you give us the reference as to where it can be obtained in the United States?

As steel tube structural engineers, we are particularly interested in the shape factor assumed for the members of the tank structure. In this country it is normal practice to take the shape factor for a tube as 0.6 times the projected area, although recent experiments have indicated that the factor is much lower. Any information you can give us on this particular point would be very much appreciated.

We, together with our parent company, Stewarts & Lloyds, Ltd., have been subscribers to your excellent magazine for a number of years. E. McMinn, Director and Chief Engineer, Tubewrights, Ltd., London, England.

The report referred to is the United States Atomic Energy Commission's WASH-182, "The Effects of Atomic Blasts on Elevated Tanks and Standpipes." It is available from the Office of Technical Services, Dept. of Commerce, Washington 25, D. C. for 704.—Ed.

Depth Recorder

Sir:

On p. 49 of your Feb. 17 issue, we note the following paragraph: "Electronics, credited with an \$8.8 billion business volume in 1954, is still developing off-trail new markets. Latest is a \$400 depth recorder, originally designed for small boats, to measure volume of ore and coal piles."

We would be interested in receiving any further information you may have regarding this recorder and, if possible, the name of the company making same so we can contact them. E. J. Sobwick, Chief Accountant, Central Furnaces & Docks, American Steel & Wire Div., U. S. Steel Corp., Cleveland.

Details on the recorder may be obtained from the Zenith Electric Co., 154 W. Walton St., Chicago 10, III.—Ed.

Pleased Author

Sir:

I have received the two extra copies of the Jan. 20 Iron Age in which my technical article "Temperature Control, Key to Longer Pot Life" has been published. First of all I want to thank you very much for these two extra copies for my files.

Secondly, I want to tell you all how very pleased I am with the way you have edited this material. I have written about 60 of these articles for THE IRON AGE alone in the past 25 years, and I get a new thrill from each new one as it appears. This is a very beautiful piece of publishing and I want everyone from printers to editors to know how very pleased I am. W. G. Imhoff, President, The Wallace G. Imhoff Co., Chapel Hill, N. C.

Forging

Sir:

Would you be so kind as to send us a few tear sheets of the article on p. 175, Dec. 9 issue, entitled "Forging: By Remote Control." E. H. Kendall, President, Kendall Contracting, Inc., Alliance, O.



Even the

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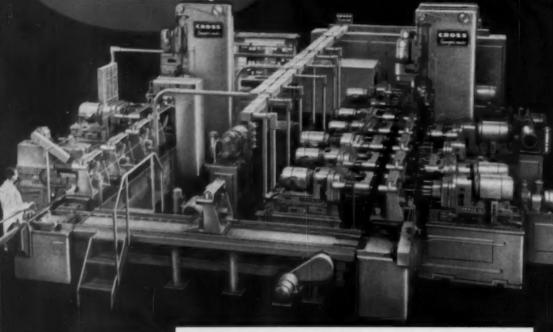
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fatigue cracks

by William M. Coffey

Whiskey and Puzzlers

Dr. Walter C. Alvarez has done a very grave disservice to man. He has shattered the long-time alibi which for ages has permitted man to ease the burden with a good conscience and only feeble and insupportable resistance from outside quarters. The doctor, Emeritus Consultant in Medicine, Mayo Clinic, says, "Another crazy idea is that whiskey is a good treatment for snake bite." Which leads us to the whiskey - drinking - salesmen puzzlers . . .

Puzziers

. . . which concerns the three salesmen who went on a hunting trip in the snake infested north woods with a 40 quart supply of anti-venom and they had to divide it equally because each had been bitten by the same snake at the same time and with equal doses. Remember, they had only a 17 quart and 14 quart drum and a 5 quart oil can with which to measure the three equal portions. Here's the way they did it. They swigged between them 4 quarts during the night. In the morning they poured the remaining serum into the 17, the 14 and the 5 quart containers which equaled 36 quarts. They then emptied the 14 and 5 quart containers into the 40 quarter. Then poured 5 quarts out of the 17 quarter into the 5 quarter and poured the remaining 12 into the 14 quarter. Then they filled the 17 quarter from the 40 quarter and then removed 5 quarts from the 17 quarter and returned the 5 quarts to the 40 quarter, thus leaving 12 quarts in each of the 17, 14 and 40 quart containers. The winners: C. W. McKinley, Dale Letterman, P. Louis Berry, Leonard C. Bickel, Orville W. Ganz, Mrs. Vunovic and Vineta Smallie, Carl H. Griffin, Jr., Paul A. Tackett, M. R. Bowerman, Dr. William B. Retallick who did it for his father, A. B. Retallick, Ed Sweet, Jim Mull and Marilyn, who as we remember doesn't dare face the hazards of marriage, the Kramer Waste Material Company. Robert S. Hanke and Chris Dowling, G. J. Campbell and A. Melling. And they all recovered from snakebite, too.

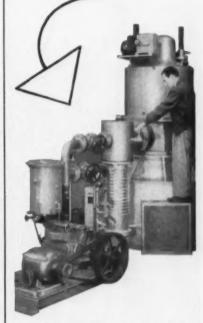
. . . and while we're at it, let's wrap up the "blocks" puzzler, which appeared in the January 27 issue. The answer: 128 blocks is the smallest number that could apply. But we'll also take 432, 1024, 2000 and the other larger numbers that will also do the trick. The winners: C. W. McKinley, who is rapidly becoming the champ, Mrs. Harry G. Woodruff, Puzzlers Anonymous, George Pascoe, who also hits the target regularly, I. M. Darcey, ole Joe Brugman (likewise), Edgar M. Hoover, George Huffman and Mrs. C. H. Pointer, who is a real "comer."

... and what about the six peddlers selling cloth (Feb. 17 issue)? Answer! The two rates were \$21 and \$1.00 — and the minimum amount each received was \$140. We received 14 answers, but only W. W. Bigelow, C. V. Faverty, C. M. Houston and C. W. McKinley were correct, and you can argue with them. Just leave us out of it.

New Puzzler

A man wants to buy a piece of carpet for a 10 x 10 ft room. He finds at the store a 9 x 12 ft carpet with a rectangular hole cut lengthwise out of the middle. The hole is 1 ft wide and 8 ft long, so he says to himself that the carpet has just the right total area—108 minus 8, or 100 sq ft. He buys it and finally figures out how to cut it into just two pieces which when rejoined will make a solid 10 x 10 ft square. How does he do it? We are indebted to Mr. Edgar M. Hoover for this one.

VACUUM SQUEEZES MONTHS INTO MINUTES!



Steel ingots cast after only minutes in high vacuum show the same gas-free characteristics as ingots cast by conventional and time-consuming methods. Kinney High Vacuum Pumps provide the fast pump down, rapid recovery, and long dependable service required for high-production processes. They are widely used alone and with diffusion pumps in all phases of vacuum metallurgy, today.

There are 14 Kinney Vacuum Pump Models, ranging in size from the super high-speed Mechanical Booster Pump Model KMB (1200 cu. ft. per min.) down to the midget Model KC-2 (2 cu. ft. per min. displacement). Bulletin V-54 and Catalog 400 give complete details — send for your copies, now. Kinney Manufacturing Division, The New York Air Brake Co., 3634 Washington Street, Boston 30, Massachusetts.



"top performers"

AETHA-STANDARD ENGINEERING CO.

The Aetna - Standard Engineering Company say—"It is our opinion on radial drills that Cincinnati Bickford Super Service Radial Drills are top performers from the standpoint of service and handling ease".

Illustrations show the top carriage of gun carriage being drilled, tapped and reamed complete on this Cincinnati Bickford Super Service Radial—holes from 1/4" to 11/4", limits within .0005".

Write for Booklet R-29.

Photos courtesy of the Aetna-Standard Engineering Company, Eilwood City, Pa.

BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.



MARCH

NATIONAL ASSN. OF WASTE MATE-RIAL DEALERS, INC.—Annual convention, Mar. 20-22, The Conrad Hilton-Hotel, Chicago. Association headquarters are at 271 Madison Ave., New York.

INTERNATIONAL ACETYLENE ASSN.

-Annual spring convention, Mar. 22-24,
Shamrock Hotel, Houston. Association
headquarters are at 30 E. 42nd St.,
New York.

AMERICAN HOT DIP GALVANIZERS ASSN., INC.—Annual meeting, Mar. 24-25, Brown Hotel, Louisville. Association headquarters are at 1506 First National Bank Bldg., Pittsburgh.

EXPOSITIONS

AMERICAN SOCIETY FOR METALS— Western Metal Exposition and Congress, Mar. 28-Apr. 1, Pan Pacific Auditorium, Los Angeles. Society headquarters are at 7201 Euclid Ave., Cleveland.

BASIC MATERIALS EXPOSITION—
May 31-June 3, Convention Hall, Philadelphia. Show management; Clapp &
Pollak, Inc., New York.

NATIONAL MACHINE TOOL BUILD-ERS' ASSN.—Machine Tool Show, Sept. 6-17, International Amphitheatre, Chicago. Association headquarters are at 2071 E. 102nd St., Cleveland.

AMERICAN MACHINE TOOL DISTRIB-UTORS ASSN.—Spring meeting, Mar, 25-26, The Greenbrier, White Sulphur Springs, West Va. Association headquarters are at 1906 Arch St., Philadelphia.

STEEL SHIPPING CONTAINER INSTI-TUTE, INC.—Annual meeting, Mar. 29-31, Biltmore Hotel, Palm Beach, Fla. Institute headquarters are at 600 Fifth Ave., New York.

APRIL

NATIONAL FLUID POWER ASSN.— Annual spring meeting, Apr. 4-6, The Broadmoor Hotel, Colorado Springs, Colo. Association headquarters are at 1618 Orrington Ave., Evanston, Ill.

AMERICAN HARDWARE MANUFAC-TURERS ASSN.—Spring meeting, Apr. 10-14, Palm Beach, Fis. Association headquarters are at 342 Madison Ave., New York.

WIRE REINFORCEMENT INSTITUTE INC.—Spring meeting, Apr. 11-13, The Greenbrier Hotel, White Sulphur Springs, W. Va. Institute headquarters are at National Press Bidg., Washington, D. C.

CONCRETE REINFORCING STEEL IN-STITUTE—Annual meeting, Apr. 11-16. The Greenbrier Hotel, White Suiphur Springs, W. Va. Institute headquarters are at 38 S. Dearborn St. Chicago.

AMERICAN SOCIETY OF LUBRICA-TION ENGINEERS — Annual meeting and exhibit, Apr. 13-15, Sherman Hotel, Chicago. Society headquarters are at 84 E. Randolph St., Chicago.

AMERICAN SOCIETY OF MECHANI-CAL ENGINEERS—Organization anniversary meeting, Apr. 16, Hoboken, N. J. Society headquarters are at 29 W. 39th St., New York.

PACKAGING MACHINERY MANUFAC-TURERS INSTITUTE — Semi-annual meeting, Apr. 16-17, Palmer House, Chicago. Institute headquarters are at 342 Madison Ave., New York.

SCIENTIFIC APPARATUS MAKERS ASSN.—Annual meeting, Apr. 17-21, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters are at 20 N. Wacker Drive, Chicago.

OPERATING CASH can make





the difference between Profits and Losses

In so many cases the difference between profits or losses is adequate operating cash. Lack of operating funds forces companies to take the expensive route in doing business:

Passing up trade discounts

Buying uneconomically

Losing sales because sufficient credit cannot be extended to the trade

Using high-cost, old machinery or equipment

Carrying incomplete inventories

Charging a premium for their product to compensate for higher internal

CASH and special plans geared to your operation come from Walter E. Heller & Company under their diversified financing services. Heller plans do not interfere with management or profits. What you make is yours. Yet—you can use as little as \$25,000 or as much as \$3,000,000, for months or years. The cost is economical for you pay only for the money you use as your need varies.

Our clients are nation-wide, established manufacturers, wholesalers, distributors in many different industries.

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To learn the facts, write for a free copy of our brochure "Operating Dollars for Every Business."

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A complete line for economical long or short runs. Swings available from 4" to 24", with lengths between centers from 18" to 240". Special tooling and hydraulic feeds for semi-automatic

cycles also available.



centerless grinders

Two sizes made for thru feed or infeed grinding of straight or profiled work. Up to 6" diameter work and 10" wide wheels. A variety of tooling, loaders and feeds available for hand or automatic operation.

Cylindrical Grinding Job

universal cylindrical grinders

For tool room, job shop or moderate production on a wide variety of cylindrical parts. Does straight, taper, internal and face grinding operations. Available in 10" to 48" swings with lengths from 24" to 120".



single purpose grinders

Maximum production of parts like pistons, rolls, crank shafts, cam contours, valves, bearing races and jet engine components. Parts can be chucked or put between centers. Work handling can be built-in.



LANDIS

precision grinders



The man who needs a new machine tool and doesn't buy it is paying for it anyway...

HE difference between your costs and your competitors' may be hidden behind the production line. It's the cost of maintaining your tooling.

There's time lost for tool sharpening! Extra floor space for extra machines in the tool room! Skilled tool dressers! Chuck alignment and maintenance! Production lost for wheel dressing!

One answer to hidden tooling costs is Microhoning

Instead of bits to be sharpened and wheels to be dressed Microhoning uses self-aligning, self-dressing tools. Throughout their life Microhone abrasives make clean, uniform cuts.

Look behind the production line and you'll find that your hidden tooling expense may total more than the cost of the latest type of Microhoning equipment, which would assure you of increased output, uniform quality, consistent accuracy of dimension and a functional surface finish. In short, you are paying right now for the new machine tools you don't have.



Suctoce Spline in gear Condition: Distorted by heat-treating

PROBLEM:

changing and sharpening of toolsannualing of surface requiredpoor surface finish

SOLUTION:

MICROHONING Tool self sharpen consistent surface finish generated

MICROMATIC HONE CORPORATION

STOO SCHOOLCRAFT AVE., DETROIT 38, MICHIGAN C HONE CORP. MICROMATIC HONE CORP. MICROMATIC CROMATIC HONE CORP.

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MICRO-PRECISION DIVISION 2205 Loo Street, Evensten, Illie

> Hydraulic controls Dissel fuel injection





OW USS MAN-TEN Steel was used to give greater strength and longer life to stacker and rake teeth!

W STEETH, long used in hay stackers, had many disadvantages for the farmer-user. They would crack easily when snagged on the ground, break under loads of baled hay and warp out of shape from dampness. To give the farmer a better, stronger and longer-wearing product, the Reiten Manufacturing Company, Cooperstown, North Dakota decided to make these teeth of steel. The steel they selected as having the necessary properties to do this job most efficiently was USS MAN-TEN HIGH STRENGTH

Now made of USS MAN-TEN Steel,

the finished teeth simplify considerably the handling of loose or baled hay. They slip easily under bales, without snagging or catching; they are so much stronger than wood that they can readily stand up under the weight of baled hay without failing; and they wear so much longer and so reduce repairs and replacements that their slightly higher initial cost is offset many times.

USS Man-Ten-one of the family of outstanding USS High Strength Steels -has a yield point 50% higher than structural carbon steel and it affords high resistance to fatigue, abrasion and impact. As was the case here it can be used to build maximum strength and stamina into vital parts and still keep the weight within reasonable and economical limits — both for the manufacturer and user.

- SOON TO BE ISSUED

Our new "Design Monuel for High Strangth Steels" contains comprehensive and practical information that you will find extremely useful in designing your product for greater economy and officiency by the use of high strength steels. Watch our future advertisements for the announcement of the availability of this important aubilization.

See "THE UNITED STATES STEEL HOUR"—Televised alternate weeks—Consult your newspaper for time and station.

UNITED STATES STEEL CORPORATION, PITTSBURGH - AMERICAN STEEL & WIRE DIVISION, CLEVELAND - COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
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USS MAN-TEN HIGH Strength STEEL



5-65

"It's the biggest alloy forging

says Edward Schuerman, U. S. Steel Hooker Leader



 $T_{\rm HAT\ PIECE\ OF\ STEEL}$ held by the crane weighs 280,000 pounds. It is 30 inches thick, over 11 feet wide, and 22 feet long. An identical piece lies on the floor. Both will be parts for an extremely large press.

If you are a steel man, you may not be especially impressed by these figures, until you realize that the forgings are made from heat treated alloy steel... and the steel for each piece was poured as one heat from a single furnace.

Just handling forgings like these is a tough job, a job that falls into the lap of men like Edward Schuerman, Hooker Leader, a U.S. Steel employee for 29 years. He has to choose the correct hook or sling assembly, spot the crane, and supervise the lift. One mistake could delay a shipment by months, but Ed has never dropped a forging in his life.

This is the kind of man who works on every USS Quality Forging. You can put your faith in these men, in the steel that comes from our furnaces, and in the modern equipment that means prompt delivery and highest possible quality.

Write for our free 32-page booklet that describes USS Quality Forgings. Address inquiries or booklet requests to United States Steel, Room 4669, 525 William Penn Place, Pittsburgh 30, Pa. UNITED STATES STEEL

"SEE THE UNITED STATES STEEL HOUR. It's a full-hour TV program presented every other week by United States Steel, Consult your local newspaper for time and station.

I ever saw!"

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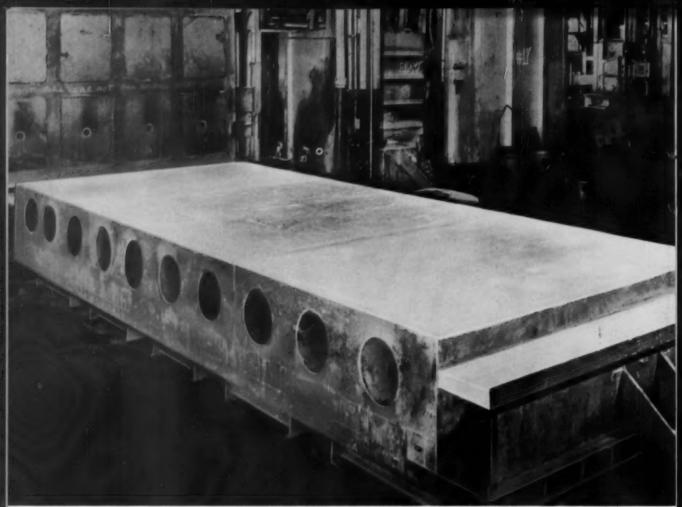
Quality FORGINGS

heavy machinery parts—carbon, alloy, stainless

forged steel rolls and back-up roll sleeves

electrical and water wheel shafts

hammer bases and columns



REFRACTORY CONCRETE CAR TOP in use at Commercial Steel Treating Co., Detroit, Mich. This car top is made with Zero ZR-13, a Lumnite-base castable produced and marketed by Standard Fuel Engineering Co., Detroit, Mich. For over 15 years this company has used refractory concrete for car tops and furnace door linings.

Why does refractory concrete make the best furnace car top?

EASY TO CAST-TROUBLE-FREE SERVICE! Despite repeated thermal shock and temperatures to 1850 F., Refractory Concrete car tops on this particular job gave more than twice the service life of car tops made with previously used materials.

These durable car tops need less maintenance . . . cut over-all costs. Smooth, one-piece sections form an even, level base for castings. And they are easy to make with Lumnite* calcium-aluminate cement and refractory aggregates.

For added convenience, you can use a Lumnite-base

castable mix-Lumnite cement plus aggregates selected for specific temperature and insulation needs. All you do is add water, mix and place. Castables are made and distributed by leading refractory manufacturers.

You'll find Refractory Concrete made with Lumnite cement excellent for use wherever heat, corrosion or abrasion are problems. Easy to place - by plastering, pouring or cement gun-and it's ready for use within 24 hours! For more information, write Lumnite Division, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

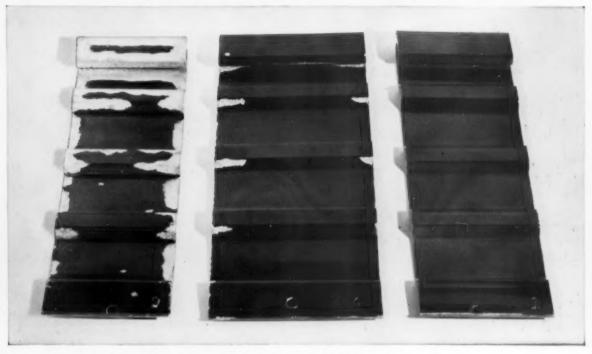
OFFICES: Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.

"LUMNITE" is the registered trade-mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

ATLASO LUMNITE for INDUSTRIAL CONCRETES



Better adhesion for porcelain enameled aluminum with PARKER PRE-NAMEL 420



Results of accelerated spalling test. These sections of porcelain enameled structural aluminum were immersed in 5% solution of NH4Cl for 96 hours. Left, untreated aluminum, center, conventionally pretreated aluminum; right, aluminum pretreated with Parker Pre-Namel 420

Here is a simple, money-saving pre-treatment which results in improved adhesion of porcelain enamel on aluminum and increases the durability several times.

Parker Pre-Namel 420, applied either by immersion or spray, produces a thin coating integral with the metal. This coating is an excellent base for the porcelain enamel.

Parker Pre-Namel makes the enameling of aluminum simpler, faster, and more economical:

It eliminates the need for pre-firing, thus effectively increasing existing furnace capacity 25% or more.

It operates at room temperature.

It produces good results within a time range of 30 seconds to 10 minutes.

It minimizes carry-out of processing material.

Parker Pre-Namel solution is replenished at intervals, need never be discarded.

This new pre-treatment extends the usefulness of porcelain enameled aluminum by adding durability while reducing the cost!

*Parker Pre-Namel—Reg. U.S. Pat. Off.

Send for Technical Bulletin

Illustrated bulletin "Parker Pre-Namel 420" will be sent free, on request.



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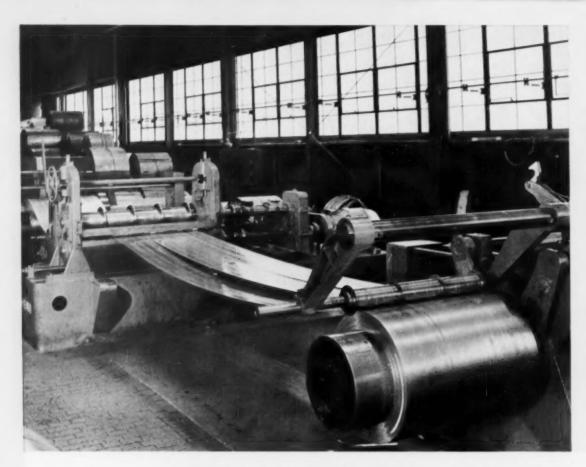
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BONDERITE Corrasion resistant paint base BONDERITE and BONDERLUBE aids in cold forming af metals

PARCO COMPOUND

PARCO LUBRITE wear resistant for friction surfaces

TROPICAL heavy duty maintena paints since 1883



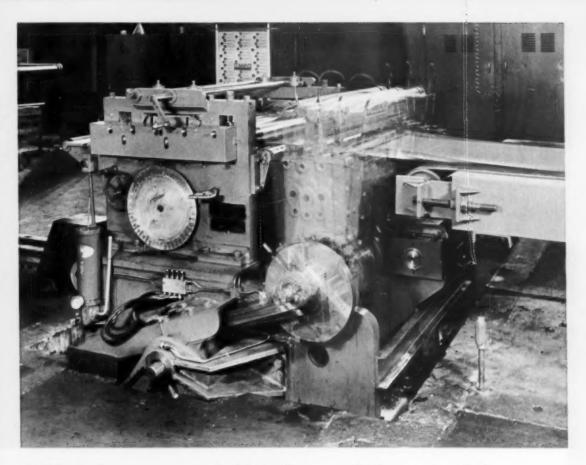
HERE'S HOW The WEAN Can Save You 20%

And

Here's A Simple Test That May Startle You

Want to save 20 percent on your steel costs? If you are using sheet steel in any great amounts a Wean Equipment engineer can quickly show you how the amazing new Wean Slitting and Flying Shear Line can effect this savings in your plant. Using your actual figures, Wean can, by a simple comparison method, quickly prove to you that these savings are possible. Why continue operating at high costs when this improved method could be saving you as much as \$20 a ton on your steel?

CHART					What SQLIPMENT CORP. JUST LANGUAGE SLIPE. SETTLES COST ANALYSIS							
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0.6							-			_		



Slitting and Flying Shear Line On Your Steel Costs

The secret of these tremendous savings is a short cut in getting steel from coil form to fabrication. If you are not one of those already using the Wean Slitting and Flying Shear Line you are either paying mill extras for shearing to tolerance and size or are forced to do this operation expensively and slowly in your own plant or a costly combination of both.

The Wean Slitting and Flying Shear System eliminates this entire processing function by converting steel from coil to production size, at resquared tolerances, at a rate of 100 cuts per minute.

Just figure it out for yourself. Apply these figures to your own operation. Total up the extras you are now paying for steel preparation and you'll see why it will pay you to talk with Wean.



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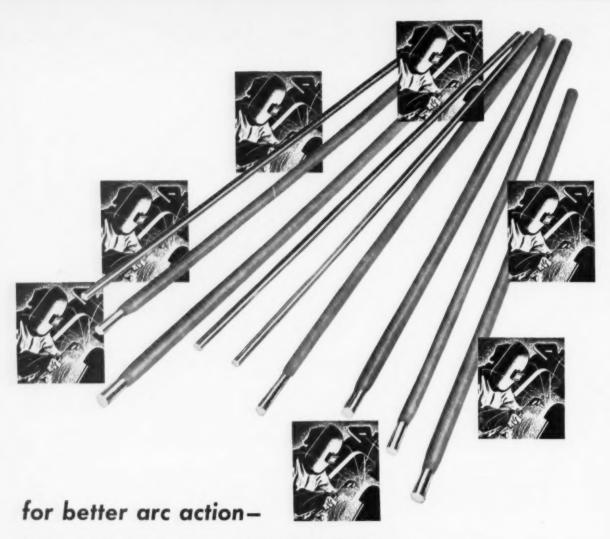
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USE CRUCIBLE REXWELD, hard-facing rods

Rexweld low hydrogen coated electrodes are easy to apply. That's because they provide improved weldability . . . more stable and direct arc. Welding can be performed both in vertical and horizontal positions. And with Rexweld you'll get denser welds . . . no porosity. Parts will resist chipping, deformation or heat checking better . . . and they can be Rexwelded again and again.

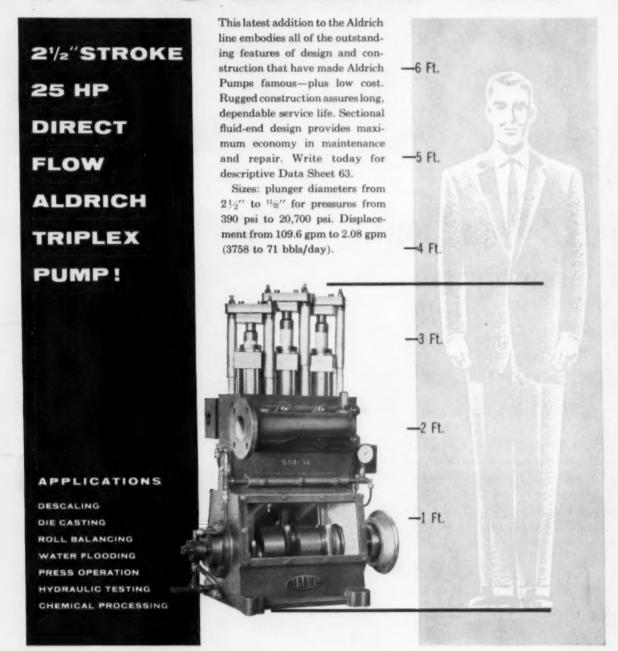
Get Rexweld rods from your local Crucible warehouse in both low hydrogen coated electrodes and bare rods, in a wide range of grades and sizes. Next time you have a hard-facing application use Rexweld. Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

NEW POWR-PAC"





. . . Originators of the Direct Flow Pump

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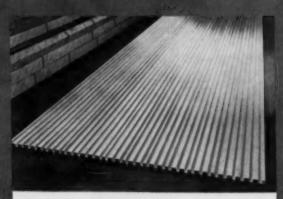
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Your Alcoa Distributor is as near as your telephone and his warehouse is stocked with the aluminum products you need for fast, economical production. His facilities include modern equipment for sawing, shearing and slitting stock to your specifications and for making prompt deliveries.



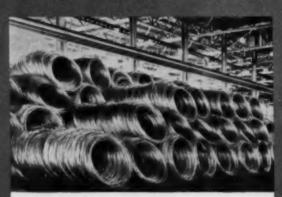
ALUMINUM COMPANY OF AMERICA



EXTRUDED SHAPES: For thresholds; window sills; doorframes; glass stops; copings; gravel stops; trim; truck bodies. Also angles; channels; tees; zees; etc., for structures.



TUBE AND PIPE: Coiled tube; Alcoa® Utilitube; straight tube in round, square and rectangular shapes; heat exchanger tubes; standard pipe and pipe fittings; construction pipe; rigid conduit.



WIRE: Coiled and straight length; flattened wire; rivet wire and rod for die heading operations in manufacture of rivets, nails, bolts and screws.



ROLLED SHAPES: Equal angles; unequal angles; channels; l-beams; tees; zees. Suited to a variety of structural applications.



SHEET AND PLATE: Flat and coiled sheet; circles; patterned sheet; plate; tread plate; roofing and siding sheet; roofing accessories and fasteners; specialty sheet.



BAR STOCK: Square, hexagonal and rectangular in all commercial alloys. Rolled and cold finished to final dimensions for superior tolerance and finish.



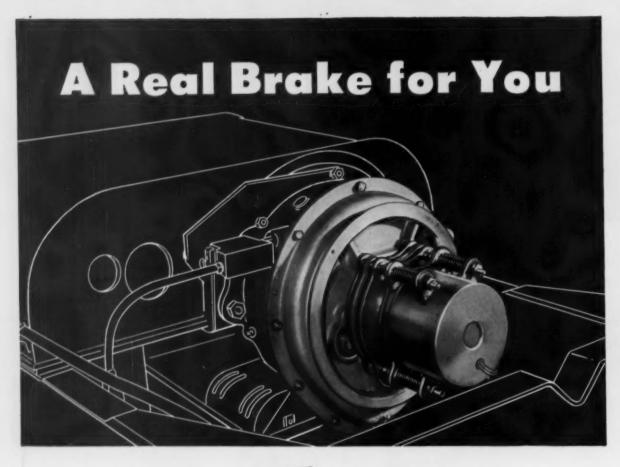
SCREW MACHINE STOCK: Available in 2011-T3 (formerly 115-T3), the free-machining alloy, and 2017-T4 (formerly 175-T4), a higher strength alloy, plus 2024, 6061 and 7075 (formerly 245, 615 and 755).



FASTENERS: Machine screws, wood screws; washers; nuts; bolts; rivets. Recommended for fastening aluminum to prevent electrolytic damage.



WELDING AND SOLDERING: Welding and brazing wire; welding and brazing flux; solder flux; solder.



now yours on Patt Trav-Lift Cranes Rectifier Brakes to end <u>all</u> AC Brake Troubles

Whichever your power, braking is always DC. Action is smooth, instantly responsive, as only 1/32" movement is required to open the brake. In the entire brake there is only *one* simple adjustment.

Ended forever are costly AC brake problems . . . the headaches you're living with right now. No flared laminations . . . No coil failures due to improper armature seal . . . No linkage troubles; there is no linkage.

Sound good? It is good . . . and only the P&H Trav-Lift Crane offers this new rectifier brake. It's another P&H advantage . . . the result of the entire crane-building job by P&H, electrical equipment included . . . to give you what's new and better in cranes. P&H Overhead Crane Division, Harnischfeger Corporation, Milwaukee 46, Wisconsin.



SEE THE TRAV-LIFT "IN YOUR OWN WORK."

New bulletin has picture sections showing Trav-Lift cranss in all services, tells about P&H Rectifier Brokes and other features. Fer all handling jobs up to 15 tons, floor or cage control. Ask for Bulletin G-51.



HARNISCHFEGER





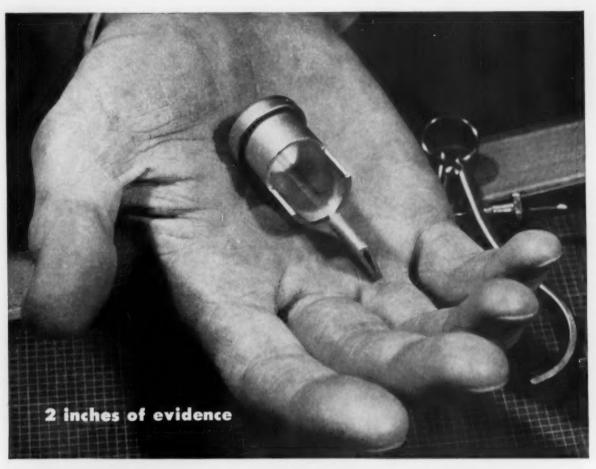












... that *Carpenter* Tubing Quality Helps Solve Design and Fabrication Problems

In the Carpenter mill a length of %'' I.D. tubing was selected at random. A 2%'' length was cut from one end. %'' of this sample was then turned back upon itself. Properly spaced saw cuts were made at the other end of the sample and the defined area folded bookwise with the tube weld at the point of the fold.

You can see the result pictured above. There are no cracks or splits at the rolled end. No trace of failure can be detected where the sample was folded at the weld.

What does this mean to you?

It means that if you are designing a part that can be bettered by the use of stainless tubing, Carpenter quality frees you from most design limitations.

It means, too, that if you are fabricating parts from stainless tubing, buying Carpenter is an easy way to insure trouble-free production even when severe working is required.

In short, there's a real difference in stainless tubing and Carpenter makes that difference. Why not examine the evidence yourself, in your own shop? Contact your Carpenter Distributor or nearest Carpenter Representative—he'll have one of these "reverse bend" samples to show you—can give you complete information on Carpenter Stainless Tubing and Pipe.



Here's information you can use. The new Carpenter Condensed Data File is packed with facts on corrosion resistance, weights, dimensions, forming and fabricating, analyses, etc. For your copy, write:

The Curpenter Steel Company, Alloy Tube Division, Union, N. J. Export Dipl.: The Curpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"





Handles Hot Loads At Cool Savings

Hundreds of installations—in different industries, under various conditions, in every section of the country—have proved beyond question that Kaloric-Type 890 is the best heat-resistant conveyor belt on the market. It is specially engineered to handle hot materials—very hot materials, even up to 350°. Under favorable conditions it will withstand much higher temperatures!

Among the hot substances successfully conveyed by this unusual belt are: coke, limestone, cement, fertilizer, sintering, ores, slag, fuller's earth, char, foundry shakeout sand, sugar crystals, soda ash, chemically processed oxide,

refractory mix, glass, asphalt and talc.

All Kaloric-Type 890 belts are made with a special Neoprene compound that gives the best heat resistance. They are available in three carcass constructions: for temperatures up to 250°F., multiple plies of cotton duck; for temperatures above 250°F., plies of a special cotton and glass fiber duck. These are woven with cotton in one direction and fiber glass in the other, and each ply reversed in direction of glass and cotton. Skim coats are applied between plies for insulation and extra flex-life. Extra heavy top covers of special heat resisting compound (½" to ½16" are not

unusual) resist temperatures that would cause ordinary belt covers to harden and crack.

Kaloric-Type 890 belts are available in widths up to 72", any length, two to ten plies, with cover thickness to suit any conditions.

We also manufacture a complete line of industrial rubber products: belting, hose, packing and moulded rubber of every need. Through your Quaker and Quaker Pioneer distributor our research and engineering services are available to help you solve any industrial rubber problem. Write for free folder and name of nearest distributor.

QUAKER RUBBER CORPORATION

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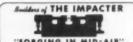
More CEC

The only gravity drop hammer with short stroke control

CHAMBERSBURG

THE HAMMER BUILDERS

CHAMBERSBURG ENGINEERING CO.



CHAMBERSBURG, PENNSYLVANIA

PORTAGE

(4" Diameter Spindle)

Horizontal Boring, Drilling & Milling Machine Outstanding . . .

MACHINE OF THE YEAR
Unsurpassed in Price and Quality

AS LOW AS \$31,358

*Pay as you depreciate plan

Write for Catalog today!

PORTAGE

The PORTAGE Boring, Drilling & Milling Machine offers a real saving in new machine investment. PORTAGE mills cost from 5% to 20% LESS than present comparable makes . . . and the amazing part of this savings is the machine itself . . Write today for literature covering all the specifications and features on the PORTAGE Mill.

* For full particulars, phone the factory today!

THE PORTAGE MACHINE CO.

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BUILDERS OF PRECISION MACHINE TOOLS, SPECIAL AND PRODUCTION MACHINERY SINCE 1916



We put our knows to your grindstone

Ever since the first man-made abrasive was trademarked CARBORUNDUM, outstanding research developments in grinding wheels have consistently come from the laboratories of THE CARBORUNDUM COMPANY. The development of a new grinding wheel by CARBORUNDUM is a carefully controlled scientific process... involving three to five years of research, engineering, and field trials. New resinoid bonds are constantly being developed for wheels that will grind cooler, cut faster and last longer, even on the new "miracle metals" and alloys. That's

why your CARBORUNDUM Distributor or salesman offers the finest, the most complete lines of wheels you can buy...made by The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

Through product quality and application "know-how"

continually puts more sense in your abrasive dollar



(Guard lifted and coolant flow stopped to reveal belt action.)

86 inches wide, in fact-by 138 inches long ... all belt! Here's why: to generate taper of the required precision on huge aluminum aircraft skins," conventional milling methods were far too slow and costly. So CARBORUNDUM abrasive engineers, in collaboration with the Air Force, Bell Aircraft Corporation, and the Hill-Acme machine people, designed and produced this special belt, in proper gradings to meet the rigid specifications of surface finish and dimensional accuracy.

• If you are stymied by an unusual grinding problem, turn to the source PHOTOGRAPHED AT BELL AIRCRAFT CORPORATION.

with the greatest experience and application "know-how" in the abrasive field today! Call in your CARBORUNDUM Distributor or salesman, or write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ont.

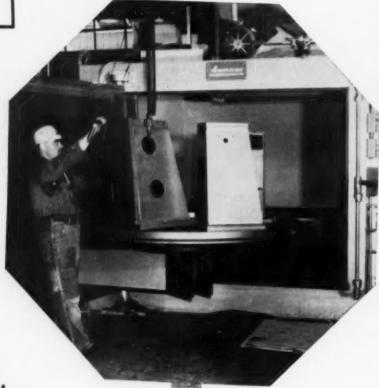
Through application "know-how" and product quality

CARBORUNDUM

continually puts more sense in your abrasive dollar



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WHEELABRATOR®
BLAST CLEAMING

cut weldment grinding time 75% at SCIAKY BROS. INC.

In making resistance welding machines, Sciaky Bros., Inc., ground the entire surface of their weldments because mill scale was very resistant to wire brushing. Some fabricated pieces, like top arms for a spot welder, shown above, required 1½ to 3½ hours of grinding to remove scale, weld spatter and rust.

Now all foreign materials right down to the virgin metal are removed from such pieces in just 4 minutes with Wheelabrator airless abrasive blast cleaning.

Grinding has been cut from an average of 2 hours per piece to a maximum of ½ hour. It is done after Wheelabrating only to remove excess metal. Efficient scale removal also has helped to lengthen tool life in subsequent machining operations.

Wheelabrator cleaning also has

provided a surface that is excellent for bonding the paint applied to the finished machines.

Whether your work is weldments, castings, forgings, heat-treated parts, stampings or any of the other metal parts, there is a Wheelabrator machine that will speed production and greatly reduce cleaning costs.

Investigate the Wheelabrator today. For complete details, send for Bulletin 74-B.

American WHEELABRATOR

originator of airless blast cleaning

AMERICAN WHEELABRATOR & EQUIPMENT CORP.,

510 S. Byrkit St., Mishawaka, Indiana



RUST-OLEUM

See local classified telephone directory under Rust Preventives or Paints for nearest Rust-Oleum Industrial Distributor.

Get proof of performance right in your own plant! See Rust-Oleum 769 Damp-Proof Red Primer applied over your own rusted metal after simple scraping and wire-brushing to remove rust scale and loose rust. Rust-Oleum's specially-processed fish oil vehicle penetrates rust to bare metal saving time, labor and money.

Rust-Oleum finish coatings in Aluminum, Gray, White, Black, Orange, Blue, Yellow, Green and others provide both Rust Prevention and Decorative Beauty! Specify Rust-Oleum for new construction, maintenance and re-modeling. See

Sweet's for catalog and nearest Rust-Oleum Industrial Distributor, or clip coupon to your letterhead . . .

There is Only One Rust-Oleum, it is as Distinctive as Your Own Fingerprint.

ATTACH TO YOUR BUSINESS LETTERHEAD AND MAIL TO: Rust-Oleum Corporation, 2562 Oakton St., Evanston, III.

- Please Show Me the Rust-Oleum "Rusted Panel Demonstration."
- ☐ Test Application of Rust-Oleum Over Rusted Metal Surfaces in My Plant.
- Color Chart.
- Complete Literature with Mearest Rust-Oleum Industrial Distributor.



THIS PLANT HAD THE RIGHT IDEA

but not the

Right

the <u>Right</u> Machine can make a whale of a difference. Sometimes it's the difference between showing a profit or just getting by. Often (in a machine job shop) it's the difference between getting the order or losing it.

Remember, the true cost of a machine is entirely dependent upon its output. If you don't have the right machine on your job, it may pay you to see that your competition doesn't get one first.

CHANGING FROM 4-SPINDLE TO 6-SPINDLE OPERATION, THIS PLANT NOW SAVES PLENTY

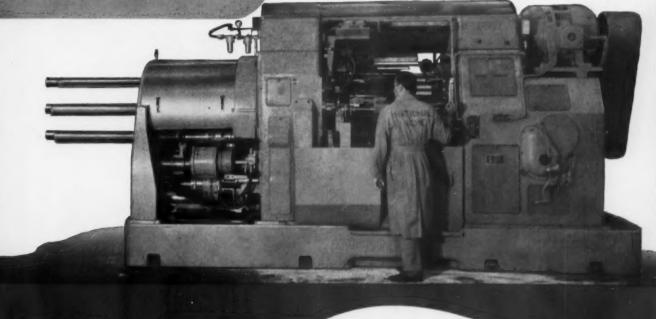
ON BIG PARTS

In a large screw machine products plant, the RIGHT machine for the job was a six-spindle bar automatic large enough to handle up to 6" bars. The 4-spindle machine they were using was large enough, but they needed the extra tooling capacity that 6-spindle operation could give them.

Could National Acme solve their problem? National Acme not only could—but did. Today this plant has an ACME-GRIDLEY "BIG 6-INCH SIX"—the largest six-spindle bar automatic ever installed in a screw machine products plant.

Today they enjoy all the production benefits on large parts that six-spindle tooling is giving them on smaller ones. The "BIG 6-INCH SIX" is breezing along day after day performing all operations simultaneously, with only the time required for the longest single cut controlling output. And it's doing it with just one machine setup.

We'll be glad to study your operation and give you our recommendation, with no obligation to you.



Remember: You can't

do TODAY'S job -with YESTERDAY'S tools --

and make a profit

ACME-GRIDLEY BAR and CHUCKING AUTOMATICS 1-4-5 and 8 Spindle • Hydraulic Thread Railing Machines • Automatic Threading Dies and Tapsa Limit, Motor Starter and Control Sention Switches • Solenoids • Control Manufacturing

The NATIONAL ACME COMPANY

175 EAST 131st STREET . CLEVELAND 8, OHIO.





STANDARD OIL COMPANY

(Indiana)

Tool Room Superintendent Max Chase (left) and Production Engineer Peter Van Dyke (right) with Standard lubrication specialist R. T. Cleland inspect frame of extruded aluminum. Bob Cleland, a graduate of Michigan State with a B.S. in Mechanical Engineering and of Standard's Sales Engineering School, has the background to provide customers with competent technical service on their lubrication problems. This training and experience, customers have found, pay off for them.

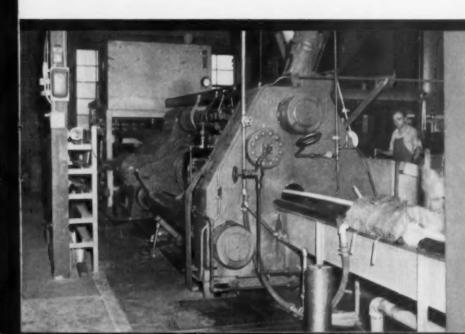
STANOIL Industrial Oil does heavy chores for Light Metals Corporation

Three years ago Light Metals Corporation, Grand Rapids, put their 1,250 ton Hydropress into operation. The initial fill for the hydraulic system was Stanoil Industrial Oil. The press has operated continuously since its start up. There is no evidence of deposits or varnish anywhere in the hydraulic system. Light Metals Corporation looks forward to many more years of such trouble-free operation.

Why was Stanoil ordered by Light Metals for their Hydropress? The answer is found in the service Stanoil has given in other equipment. Back in 1948 when a Watson-Stillman extrusion press went into operation for Light Metals, Stanoil was chosen as the hydraulic oil. As with the Hydropress, Stanoil has a perfect performance record. The Watson-Stillman press has operated seven years without a shutdown because of hydraulic fluid failure.

This kind of service from a hydraulic oil means Light Metals Corporation can turn out extruded aluminum shapes for the aircraft, automotive and major appliance industries with high performance and low maintenance factors that mean bigger profits. Reason enough for relying on STANOIL.

STANOIL Industrial Oil can perform for you just as it is doing for Light Metals Corporation. In the Midwest a lubrication specialist from your nearby Standard Oil office will explain how. Call him. Or contact, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



Light Metals Corporation uses this 1,250 ton Hydropress for extrusion of aluminum shapes for aircraft, automotive and major appliance industries. Press operates at 2,840 psi in the hydraulic system. Hydraulic medium is STANOIL. TUTHILL PUMP COMPANY EXPERIENCES ...

TAILUMES

SINCE USING



SEVERELY COLD-WORKED, FURNACE-TREATED
STEEL BARS

SAVES MONEY, TOO!"

● Tuthill knows the rotor is the heart of their pump. Quality cannot be compromised. For more than 10 years, Tuthill has used STRESSPROOF for rotors (replacing heat-treated alloy steel) without a failure!

Strength is required in these rotors to transmit the power through the shaft to the idler gear. Extremely high operating speeds mean the rotors must be straight. Wearability is an absolute necessity if the rotors are to stand up under severe operating conditions.

STRESSPROOF has all of these qualities. In addition, it is readily machinable. Its in-the-bar strength eliminates heat treating with its distortion, cleaning and subsequent machining problems. No rough machining, heat treating and finish machining with STRESSPROOF. The rotors are finish-machined from the bar.

STRESSPROOF's minimum warpage eliminates all straightening operations in this case. Its wearability keeps the rotor running year after year. It also provides real savings in both material and manufacturing costs.

STRESSPROOF makes a better part at a lower cost.

AVAILABLE FROM LEADING STEEL DISTRIBUTORS COAST-TO-COAST



Tuthill Model L Series mechanically sealed pumps are used in lubricating, hydraulic, transfer and burning oil service. Capacities range from ½ to 6 g.p.m. at pressures up to 600 p.s.i. The rotors for these dependable industrial pumps are made from La Salle STRESSPROOF.

WRITE TODAY FOR

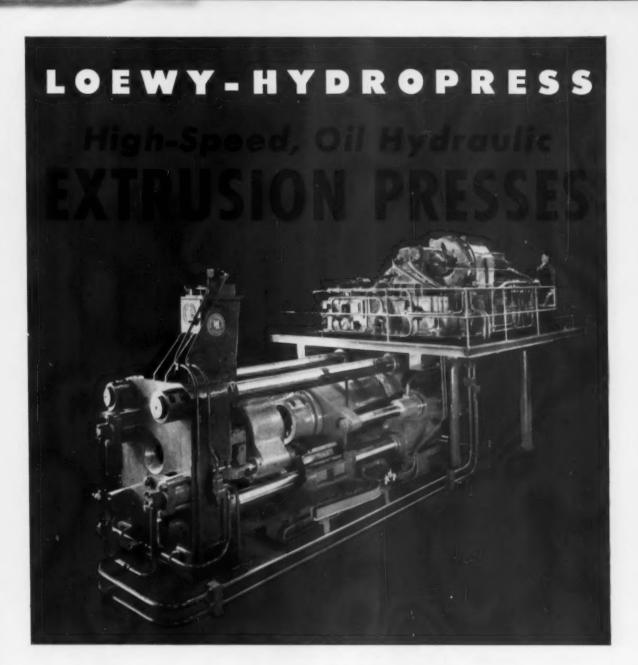
helpful data bullatin No. 15... "Improve Quality—

Cut Costs"





MANUFACTURERS OF AMERICA'S MOST COMPLETE LINE OF



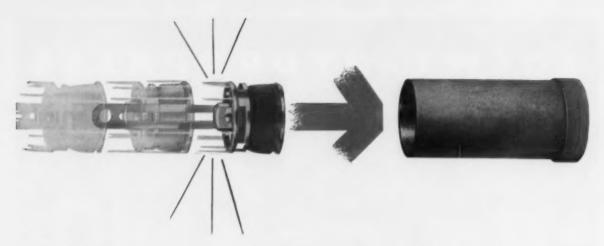
ASK FOR FULL INFORMATION



Package Unit

of 2200 ton capacity
on the erection floor
Completely piped, wired and
tested, prior to shipment.

Rolling Mills . Hydraulic Presses . Pipe Testing Machines . Special Pipe Mill Equipment . Accumulators . Pumps . Die Casting Machines



How to soak up shock and

Underwood Corporation
did it by using
Republic
ELECTRUNITE
Stainless Steel
Tubing

This was the problem: find a material for the cylinder in the carriage shock absorber on an accounting machine. The cylinder must have an accurate bore, little variation in diameter, and negligible eccentricity. It must also have a suitable finish to reduce drag, because the piston which fits inside must be completely retracted in less than a tenth of a second.

Republic metallurgists suggested ELECTRUNITE Stainless Steel Tubing. It was drawn to meet dimensional requirements. The finish was excellent. And Underwood reports good service life because of excellent wearing qualities.

Republic Steel Corporation 3104 East 45th Street Cleveland 27, Ohio



- ☐ Enduro® Stainless Steels
- ☐ ELECTRUNITE® Stainless Steel Tubing and Pipe
- Republic Nuts and Bolts
- Republic Chateaugay Pig Iron

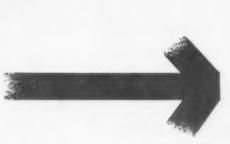
Name_____Title____

Company____

Address



BUSINESS MACHINE PARTS COST LESS because they last longer when they're made of Republic Enduro Stainless Steel. On this Addressograph-Multigraph office machine, ink corroded the carbon spring steel from which the ribbon guards and lister spacing bands were made originally. Carbon steel also cracked under the operating strain. Enduro Stainless Steel resists this corrosion, has the necessary springiness and wears well, despite the abrasive action of moving the ribbon.





cut costs!

Underwood now saves 75 cents on material costs for each shock absorber.

This is only one of many customers for whom Republic has saved money. Sometimes we save material costs. Sometimes production costs. Often, both. And since we manufacture both stainless steel and carbon steel tubing in many analyses, we are equipped to help solve all kinds of tubing problems.

Fill out the coupon below for more facts on Republic ELECTRUNITE Mechanical Tubing, Or call your nearest Republic district sales office.



ECONOMICAL MACHINING IS ONLY ONE REASON why a leading maker of heatresistant glass products uses Republic Chateaugay Pig Iron for glass molds. This premium pig iron, supplied exclusively by Republic, also assures a dense, fine grain structure; longer mold life; fast-flowing and even-cooling characteristics. Hard surfaces resist heat and wear.



CUTTING COSTS ALSO APPLIES TO BUYING FASTENERS for your assembly and maintenance work. One call to your Republic Distributor gets all the fasteners you need. There's no shopping around, no time lost. Paper work is reduced. And, you get exactly what you want because Republic makes and stocks over 20,000 types and sizes of regular fasteners, everything from machine bolts to sheet metal screws. You can depend on Republic Fasteners for quality, uniformity, ease of application, long service life. Quick delivery, too.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products Now...modernize your grinding operations without draining away your capital!

Take advantage of the Norton Grinding Machine Lease Program

for low-cost leasing of new Norton grinders and lappers

Naturally, you want to meet competition on at least equal terms — with the latest and best in modern grinding equipment.

Yet, like so many other manufacturers, you may want to conserve your working capital — and so the cost of replacing inefficient producers is delaying, if not prohibiting, your modernization.

What's the answer?

The answer is the Norton Grinding Machine Lease Program, developed to help manufacturers secure the grinders and lappers they need for modernization—without weakening their financial position.

The new Norton Program gives you three separate plans for leasing new Norton grinders and lappers, with payments extending over a seven-year period. Each plan meets specific requirements. Each plan is extremely flexible, providing for early termination of the lease, or purchase of the equipment, at your option.

One of these plans may help pave the way to better business for you. Don't miss getting complete facts on them — send in the coupon!

This folder tells you how you can pay for Norton machines while they're building your profits!



10 x 36" Type CTU Semiautomatic Cylindrical Grinder



8" Hydraulic Surface Grinder



No. 20 Cutter and Tool Grinder





Crinding Machine
Lease Program

Type CV-4 Semiautomatic
Angular Wheelslide Grinder



No. 26 HYPROLAP* Lapping
Machine



12" Universal Grinder

Under the Norton Grinding Machine Lease Program the machines illustrated here—and many more—are now available to you, under low-cost, flexible leasing arrangements.

This folder describes the Program giving details of

the three different plans by which you can improve your competitive position and profits. Send for it now — and remember: only Norton brings you such long experience in both grinding machines and grinding wheels to help you produce more at lower cost.

To Economize, Modernize With NEW



GRINDERS and LAPPERS

Making better products . . . to make your products better

District Sales Offices: Warcester • Hartford

New York (Teterboro, N. J.) . Cleveland . Chicago . Detroit

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON COMPANY, Machine Division

Worcester 6, Mass.

Please send me your folder on the Norton Grinding Machine Lease

Name

Company.

Address Zone ... State

For faster load discharge...low cost operation...longer life...

EC&M Magnet Controllers have earned a reputation for improved magnet operation. Loads are discharged quickly...cleanly...without "dribble". Magnets "work more" because faster drops eliminate "positioning" the magnet at point of discharge.

A simple two-position (lift-drop) Master Switch makes operation easy . . . power is off when the master switch is in the drop position. This prevents overheating, keeps lifting capacity high, and substantially adds to magnet life.





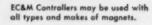
For single magnets or two magnets in parallel . . . Type AD STANDARD Controller has exclusive adjustable discharge feature for different type loads . (dial on door).



BOOSTER Controller gives increased pull-away power from pile, then carries load at reduced current.



HIGH SPEED RELEASE DLM-335-A Controller reduces discharge time of deep-type magnets 50%.





Write for Bulletin 905



THE ELECTRIC CONTROLLER

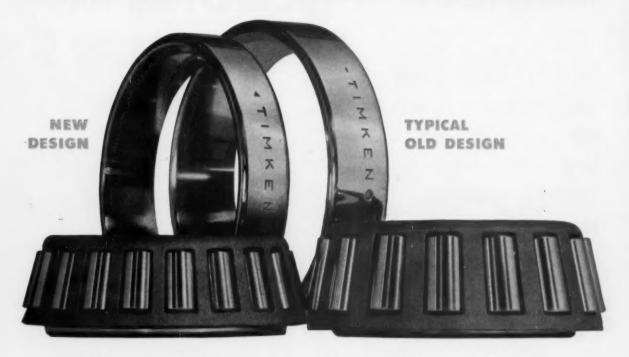
& MANUFACTURING COMPANY

2698 East 79th Street • Cleveland 4, Ohio

616

THE IRON AGE

THREE NEW TIMKEN® BEARINGS **COST LESS THAN PREVIOUS** BEARINGS OF SAME BORE SIZES



New capacity-packed bearings take up less space, save weight

THREE new and available in bore sizes of 4", 14" and 13/4". They cost less because they are substantially reduced in width and outside diameter compared to previous designs.

Because they take up less space, the new Timken bearings permit savings in related parts, too. And no other bearings have ever delivered

so much capacity in so little space.

The new bearings offer two big opportunities to bearing users:

1) Savings through redesign of present tapered roller bearing applications and 2) advantages of Timken tapered roller bearings for new applications, at minimum cost.

In less than a year, over 1,000,000 of these new bearings have already proven themselves in automobile front wheels and other applications.

Why not re-examine your bearing applications today to see where the new Timken bearings can cut your costs or improve your product's quality, or both? Bearings and auxiliary parts are now available. For complete information, write: The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".

.. your number 1 bearing VALUE

NOT JUST A BALL 🔾 NOT JUST A ROLLER 💷 THE TIMKEN TAPERED ROLLER 📁 BEARING TAKES RADIAL 🗓 AND THRUST $-\emptyset$ —Loads or any combination



HERE'S REAL MATERIAL HANDLING NEWS

New STEARNS 2-coil magnetic pulley removes more tramp iron than larger units on many conveyor operations—yours may be one

Stearns now offers a powerful new electromagnetic pulley that provides exceptional tramp iron removal throughout the entire load mass. Two-coil design produces a magnetic field that is deepest at the center of the conveyor belt where load is heaviest. The area of magnetic attraction is the same general shape as the load on a conveyor operating under standard conveyor practices.

Pulley costs less

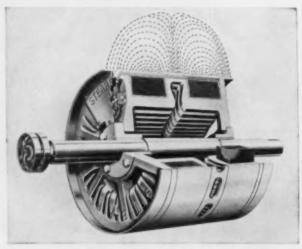
Because of the nature of the magnetic field, smaller pulleys costing less, can now be used on jobs where larger units were formerly needed. An examination of data on a number of proposed installations showed that, in the majority of the cases, the recommended new 2-coil pulley is of smaller diameter than a 3-coil pulley handling the same job.

Get all the facts on this new magnetic pulley. Find out how it simplifies pulley selection. Write for bulletin 303-C.

SIMPLIFIED PULLEY SELECTION METHOD®

Because this pulley fits right into recommended conveyor standards for speed of belt travel and depth of load for various types of materials, it is far simpler to select the right pulley than ever before. Stearns provides new selection tables in Bulletin 303-C that now make it possible for you to select the right size unit for your job even before you consult our sales engineers.

*Copyrighted 1954 Steams Magnetic, Inc.



Cutaway showing 2-coil construction. This design provides a deeper magnet field at the center of the pulley — a pattern which conforms to normal load conditions.



Diagram showing magnetic field for 2-coil, 36-in. dia., 42-in. wide pulley. Note how magnetic field blankets entire load.



Diagram of same size 3-coil pulley. Note how center of load extends above magnetic field. Conveyor would require a larger pulley operating at slower speed in order to do an effective tramp iron removal job.

MAGNETIC EQUIPMENT FOR ALL INDUSTRY

STEARNS



MAGNETS

STEARNS MAGNETIC, INC., 691 S. 28th St., Milwaukee 46, Wis,

PUNCHING

104 holes every 10 seconds accurately The multiple punching of these holes must be very rapid, and their location as well as spacing must be held accurately.

The assembly of these 24 trailer frames is smooth and economical with no costly hand fitting.

With this punching equipment, position, size and spacing of holes may be changed quickly and at low cost.

The Brake can perform many other operations as desired converting from one operation to another quickly and at low cost.

Write for the New comprehensive Catalog B-4.

Photo-Courtesy Youngstown Steel Car Corporation.

296 INCHES

Material: 3/16" mild steel.

Maximum number of holes:
104. Maximum diameter of
hole: 1-3/16".



THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS . SHEARS . BRAKES



- INCREASE ROLL NECK BEARING LIFE
- ELIMINATE REMACHINING COSTS
- USE LESS LUBRICANT

with **BROOKS**

EADOLEN

Costly roll neck wear, remachining and down time can be eliminated in blooming, slabbing, structural, wire, skelp, lapping weld, rod and pipe mills-with Brooks Leadolene Klingfast. Having a thin film of semi-hardening nature, this lubricant does not hold scale which creates abrasive conditions. Scale is continually flushed out by water which does not affect or wash off this cost reducing lubricant. Furnished in grease or oil for hand packing or for use in pressure systems.

*The I.P. Lubricant with Indestructible pH-ilm.

Read this Case Study

FOR PROOF OF LEADOLENE KLINGFAST'S SUPERIOR QUALITY AND COST REDUCING PERFORMANCE

In a lubrication study conducted over a period of one year on a 40" blooming mill, Brooks Leadolene Klingfast proved its efficient, cost reducing qualities. Best competitive E. P. Lubricants were consumed at the rate of twenty drums per week, and bearings wore out in two weeks' time. With Leadolene Klingfast, bearings showed no wear after twelve weeks and only four drums were consumed per week.

SEND COUPON FOR COMPLETE DATA!

The Brooks Oil Company 934 Ridge Avenue Pittsburgh 12, Pa.

Please send complete information on Leadolene Klingfast for roll neck lubrication.

MAME

COMPANY TITLE

ADDRESS.

CITY_

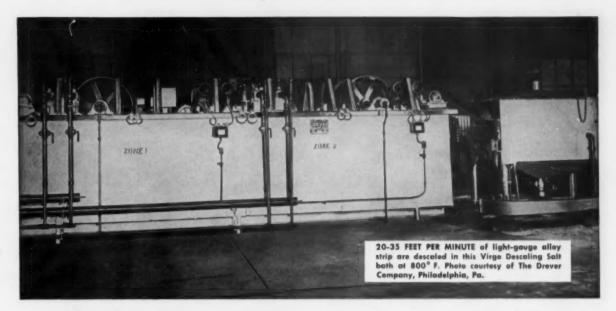
STATE

ZONE

The Brooks Oil Company

Executive Offices and Plant, Cleveland, Ohio Executive Sales Offices, Pittsburgh, Pa. Canadian Offices and Plant, Hamilton, Ontario

Cuban Office, Santiago de Cuba Warehouses in Principal Industrial Cities



HOW TO

DESCALE 51/2 MILES OF STRIP PER DAY

You can get clean bright surface in ONE operation with VIRGO® DESCALING SALT

Straight chrome and chrome nickel strip flow through this continuous descaling-annealing unit, at 25-35 feet per minute—about 5½ miles per 24 hour day.

The light-gauge strip is descaled in one pass through a bath of molten Virgo Descaling Salt at 800° F., after annealing. The process yields a chemically clean, bright surface with no pitting, etching or metal loss.

Large or small, your plant can show real productiontime savings with the Hooker Process using Virgo Descaling Salt, or with the Virgo Molten Cleaner process. Use these processes on stainless and alloy steels; castings; forgings; fabricated parts; material to be salvaged. Both processes are non-electrolytic... non-toxic ... employ simple equipment ... do not require close supervision ... are easily adapted to your production methods. For full details, mail coupon or write us today.

For Fast, Safe, Low-Cost DESCALING

VIRGO® DESCALING SALT—Producers and fabricators of stainless and alloy steels use Virgo® Descaling Salt to quickly remove scale produced by hot rolling, forging, extruding, casting, annealing.

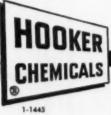
VIRGO® MOLTEN CLEANER—Quickly, positively desands and degraphitizes castings; removes grease, dirt, chemicals, paint, enamel, rubber atmospheric corrosion and other impurities.

BOTH HOOKER PROCESSES are backed by 15 years' experience in salt bath descaling and cleaning. Engineering, research and on-site operating assistance are part of our service.

SEND FOR THESE BULLETINS

They tell the whole story on Virgo Descaing Salt and Virgo Molten Cleaner—what they are, how they work, their advantages, equipment involved, and the Hooker services you enjoy as a user of the process.





1905—Half a Century of Chemicals From the Salt of the Earth—1955

HOOKER ELECTROCHEMICAL COMPANY

33 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y. NEW YORK, N. Y. LOS ANGELES, CALIF. TACOMA, WASH. CHICAGO, ILL.

Hooker	Elec	trochem	ical	Compan	y
		ST., NIAGARA			_

Please send me Bulletins checked: Virgo Descaling Salt
Virgo Molten Cleaner

NAME_____

COMPANY____

ADDRESS ZONE STATE



Using a VICTOR No. 310 torch butt with two S2 extensions and No. 8 type 4 tip, Joe Wyman (Shreve Welding Co., Oakland, Calif.) repairs cast iron heating boiler header with VICTOR No. 1 low furning manganese bronze rod. Inset photo shows 5/64" build-up on undersize castings, done with same No. 310 torch but with No. 5 type 4 nozzle and VICTOR No. 6 square cast iron rod.

VICTOR'S wider work range pays off from the day you select your first VICTOR welding outfit on through a lifetime of reliable service. You buy the torch you need for your present work, add extensions, cutting attachments or special nozzles as they're needed. Result: top-quality equipment that's always perfectly matched to your needs!



Whatever the job
... welding, cutting,
heating, brazing, descaling
... you'll start it quicker,
finish it sooner with
versatile VICTOR equipment!



LOOK FOR THE VICTOR DEALER SIGN... ask him to show you why it costs less to own and operate VICTOR.

for welding VICIOR EQUIPMENT COMPANY

Mirs. of wolding & cutting equipment; hardfacing rads; blasting nextles.

3821 Sonto Pe Ave. LOS ANGELES 58 844 Folsom Street SAN FRANCISCO 7



Cold steel flows like putty... with Pennsalt's FOS PROCESS

(SAVES TIME . METAL . LABOR)



Cap nut blank



Cold extrusion is made practical, cold working of steel is more profitable with Pennsalt's Fos Process, a new method of locking a phosphate coating and lubricant onto a steel surface. Cold steel actually flows like putty when extreme pressures are applied. With Fos Process there is no breakdown of lubricants to cause seizing and galling. Die life increases...in one case by 666%!

Where can you use the Fos Process? In mass production of steel automotive and ordnance parts, in tube and wire drawing. Expensive steel alloys can often be replaced with

plain carbon steels. The combination of Fos Process and severe cold working upgrades the physical and metallurgical properties of the steel...cuts unit costs!

Look at these few parts carefully. Many more parts and shapes like these can be cold-extruded or cold-headed economically, with little finish machining, by using Pennsalt's new Fos Process. Call the specialist from Pennsalt for a complete survey of your production line. Often your blueprint can help him determine rapidly if the Fos Process is for your immediate use. Fill in the coupon . . . get all the facts now!

Pennsalt Chemicals

Metal Processing Dept.
Pennsylvania SaltManufacturing Company
1073 Widener Bldg., Philadelphia 7, Pa.

- Have Pennsalt specialist call.
- Send technical illustrated folder.
- Enclosed is blueprint...can I use Fos Process in mass-producing by cold extrusion?

Nums......Title.....

Company



The issue of



you'll save for the next 100 years...

. . . because The Iron Age's "100 Years of Metalworking" will be the most comprehensive issue of a magazine ever published on metalworking.

In this 100th year commemorative issue you'll find a review of the past, a discussion of the present and—most important—a prediction of the future of every phase of the giant metalworking industry. The list on this page gives you just the bare skeleton of this giant editorial enterprise.

"100 Years of Metalworking" will be a treasured collector's item.

And it will serve as a planning guide for future industry expansion and future technological development.

The publication date is Mid-June. You'll receive it as part of your regular subscription to The Iron Age.

Watch for "100 Years of Metalworking" - Mid-June, 1955



The earliest issues of The Iron Age
—first published in 1855
—still in existence in this country.

\$500.00 reward will be paid for the issue you discover and submit with the oldest dateline (send photostats or facsimiles—actual issues only if you are a contender). The issue shown at right is one of the earliest copies still on file in The Iron Age's office. Older copies may have similar characteristics.

For complete details of this reward write for set of rules governing entries.

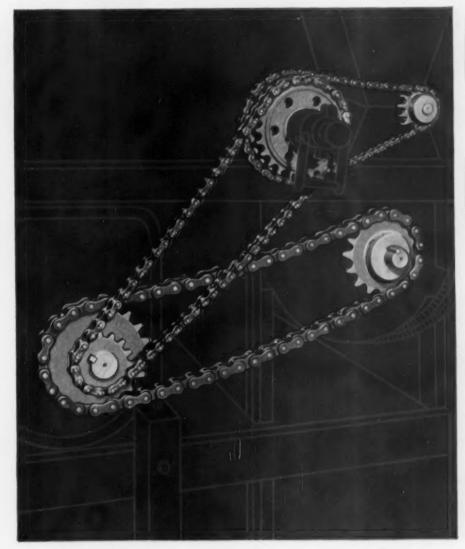




Old Issue Information • 100 East 42nd Street, New York 17

- Iron Age History
- Atomic Energy
- Casting
- Heat Treating
- Iron and Steel
- Machine Tools
- Materials Handling
- Metal Finishing
- Nonferrous Metals
- Press Work
- Refractories and Ceramics
- Testing, Inspection and Instrumentation
- Welding, Brazing and Joining
- Prices and Production
- Rebuilt Machinery

In roller chain ... EXTRAS* like these give you extra reliability

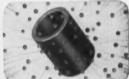




LOCK-TYPE BUSHINGS (applied on a range of sizes) end a cause of stiff chain.



PRE-STRESSING of multiple width chain provides uniform load distribution.



SHOT-PEENED ROLLERS have greater fatigue life, added ability to withstand impact.



CLOSER HEAT-TREAT CON-TROL — coupled with rigid testing insures uniformity.

*And you pay no premium for these LINK-BELT extras

B is reason why Link-Belt Precision Steel Roller Chain is first choice for so many tough jobs is that it has extra reliability built-in. For example, pre-stressing smooths out any irregularities of multiple width chain in advance. And it's just one of many extras you get as standard from Link-Belt. Check the three others shown here. Then call the Link-Belt office or authorized stock carrying distributor near you for facts on Link-Belt's complete range of roller chain and sprockets. Data Book 2457 gives full information on single and multiple widths, in ½" to 3" pitch, 1" to 3" double pitch. Ask for your copy.

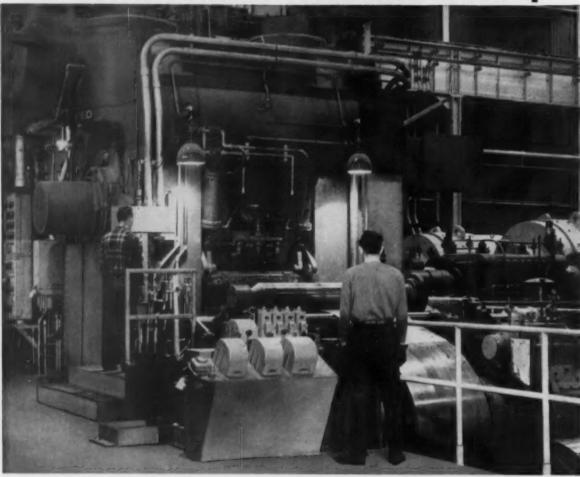


ROLLER CHAIN & SPROCKETS

13,700

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Customers like the uniform high quality of our cold rolled sheets and strip. They find that with Youngstown they have few rejects, low fabrication costs.

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Cold reduction mill at our Indiana Harbor Works, now completing its first year of full-scale operation.



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mean...longer mill runs...less handling time

High-speed end to end welding of ferrous and non-ferrous strip on this Weld-A-Matic Splicer builds up coils to larger sizes, greater weights. And automatic, rapid coil build-up means practically continuous mill operation ... longer mill runs ... less handling time.

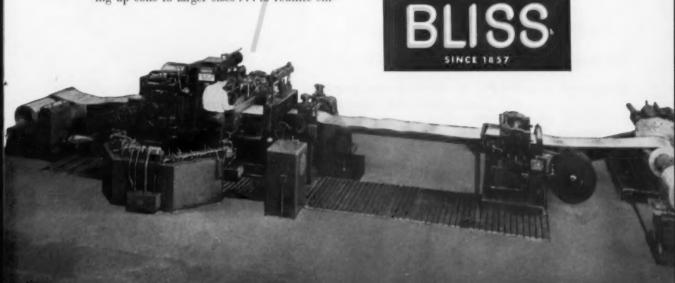
The Splicer butt welds brass or copper strip, low, medium and high carbon strip, chrome and nickel-chrome stainless strip, silicon strip and several grades of aluminum—using the shielded arc principle. The weld itself is clean, ductile, and as strong as the metal itself. No trimming is required on the weld before it enters strip-processing machinery.

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Gages spliced range from 0.014" to 0.3125"; speeds from 25 to 120 inches per minute depending upon the gage. No special welding skills are required by operators.

For more information about Weld-A-Matic Splicers, and what they can mean to you, write or call today.

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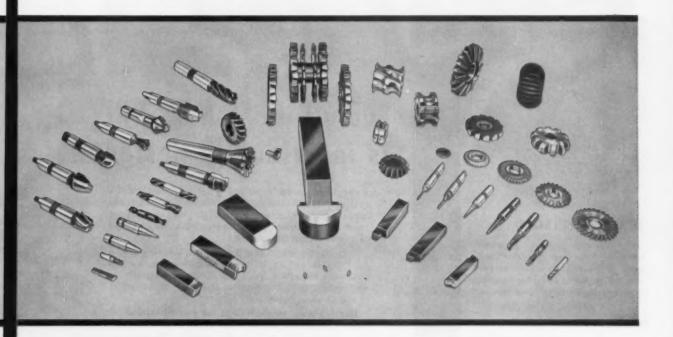
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Herringbone-geared reduction unit designed to transmit power to a 134" three-high, sheared plate mill, reducing motor speed from 375 to 70.35 RPM.

TARREL CONTRACTOR

2000 HP PINION STAND

21" pinion stand designed to transmit power to a four-high aluminum sheet mill. The heat-treated, forged steel pinions are continuous-tooth herringbone, generated by the Farrel-Sykes process.

2000 HP COMBINATION UNIT

Built to transmit power to a two-high, cold brass, breakdown mill, this combined drive and pinion stand has first reduction gears and mill pinions of the Farrel-Sykes herringbone type, while the second reduction gears are split (divided) double helical.

Every FARREL MILL DRIVE is individually designed

Power and speed, type and gauge of metal to be rolled, process (hot or cold), nature of load (continuous or intermittent), type of drive motor—all are taken into account before the size, material and type of construction are specified.

This development of a Farrel unit, whether it is a gear drive, pinion stand, or combination, assures optimum efficiency, plus the inherent strength to withstand the shocks, stresses and wear encountered in continuous, heavy-duty service.

Herringbone, single helical, or a combination of single and double helical gears may be furnished for gear drives. Mill pinions are usually herringbone type, although single helical pinions can be supplied. These gears and pinions are precision-generated by the famous Farrel-Sykes process, assuring accuracy of tooth spacing, profile and helix angle, resulting in high efficiency, and smooth, quiet operation.

Send today for information on these individually engineered mill drives. Or, if you prefer, a Farrel engineer will be glad to discuss your drive problems with you.

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FB-990

arrel-Birmingham



Products' modernized Homocarb furnace after carbon has been restored under Microcarb control. At left are valve stems of 0.40% carbon steel, ready for carbon restoration to a depth of 0.010" in a 2 hour cycle.

Decarb Correction with Microcarb Saves 4 Ways

A real decarb problem has been ended at the Bell, California plant of Thompson Products, Inc. In the production of valves and aircraft parts, decarb kept cropping up at various stages in fabrication. The problem was to correct it without interrupting production by making a special case of each occurrence.

The solution to the problem appeared with Microcarb atmosphere control, which automatically measures and regulates the active carbon inside a Homocarb furnace. Thompson applied Microcarb equipment to one of their 25" x 36" Homocarb furnaces. It didn't take long to prove that Microcarb was the tool needed to lick the decarb problem.

Now this furnace handles any decarb condition on a production basis. It restores either mill decarb or surface carbon lost in hot-working, and replaces surface carbon on any part which has been decarburized below finished specs.

Fourfold savings have resulted:

- No more decarburized products; no rejects due to decarb.
- No more excessive machining to correct for non-uniform carburizing.

- 3. Reduction in inspection time.
- 4. Decarburized mill stock can be restored.

The combination of Homocarb furnaces . . . either pit or horizontal type . . . with Microcarb atmosphere control makes the measurement and control of active carbon inside the furnace just as continuous and automatic as temperature control. Whether specifications demand case carburizing, hardening, homogeneous carburizing or carbon restoration . . . the carbon you set is the carbon you get!

If you're now using Homocarb furnaces, Microcarb control can be added by your regular maintenance crews. To explore potential savings and conversion costs, there's an L&N field engineer ready to help you. Just phone the nearest L&N Office or write us direct at 4956 Stenton Ave., Phila. 44, Pa. For details about the workings of Microcarb control, request Catalog TD4-620(2).



WHICH OF THESE TAPES can save



1. TAPE you can SEE through!

"SCOTCH" Brand Cellophane Tape—12 colors and transparent —is crystal-clear and sticks at a touch for hundreds of holding, bundling, and repairing jobs.



3. WORLD'S STRONGEST TAPE

"SCOTCH" Brand Filament Tape offers up to 500 lbs. tensile strength per inch of tape width. For every heavy-duty bundling, holding, and reinforcing job.

2. TAPE that takes CURVES!

"SCOTCH" Brand Masking Tapes have flexible creped backings that let them conform to curves and irregular surfaces—makes them superior for paint masking, suitable for hundreds of holding, bundling, and sealing jobs.

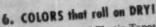


4. TAPE that sticks on BOTH SIDES!

"SCOTCH" Brand Double-Coated Tapes solve many holding, bonding, laminating, and mounting problems. Easy-to-apply; tightholding on both sides!

5. TAPE that STOPS MOISTURE!

"SCOTCH" Brand Acetate Fibre
Tape—long-aging, moisture-andweather resistant... aticks at below-freezing temperatures. Comes
in 12 colors and transparent.



"SCOTCH" Brand Plastic Tapes come in eight vivid colors; are thin, tough, stretchy, long-wearing; resist acids, alkalies, greases, abrasion, common solvents.



the most...do the most...for you?

● It depends on your problem! "SCOTCH" Brand Pressure-Sensitive Tapes can hold, mask, protect, seal, bind, bond, palletize, decorate, identify—handle hundreds of different types of jobs for metal processors. And handle these jobs quickly, easily, inexpensively. What's more, nearly all tape applications can be made with automatic or semi-automatic equipment if desired. Such equipment can often change a manual operation into a mass production step overnight. Here are just a few ways "SCOTCH" Brand Tapes can help solve problems and cut costs for you:



PLASTIC tapes mark lanes for traffic, define storage areas, lay out production-flow patterns. Apply to any clean, dry surface in minutes—no shutdowns. Last up to 2 years and longer.



DOUBLE-COATED tapes provide a sticky surface to hold small parts or units for various operations. Above: tape applied to bed of milling machine eliminates need for clamp set-up.



FILAMENT tape can secure odd-shaped parts quickly and easily with just a few quick wraps. "SCOTCH" Brand Filament Tape has an exclusive "mirror-surface" adhesive that sticks at a touch; parts can't come loose. Tape won't scratch or mar soft metals; strips off clean with no adhesive residue.



MASKING tape, used for either selective or stop-off masking, makes any painting operation faster, cleaner, easier. Above: special "SCOTCH" Brand High-Heat Masking Tape used for bake-oven operation withstands temperatures up to 375°F.



CELLOPHANE tape holds small parts on job tickets or blueprints. Crystal-clear tape allows immediate identification of part; does not obscure printing



ACETATE FIBRE tapes can be printed to identify parts. Roll is kept in bin with part—correct label is quickly applied to carton or to part itself.

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St. Paul 6, Minn.

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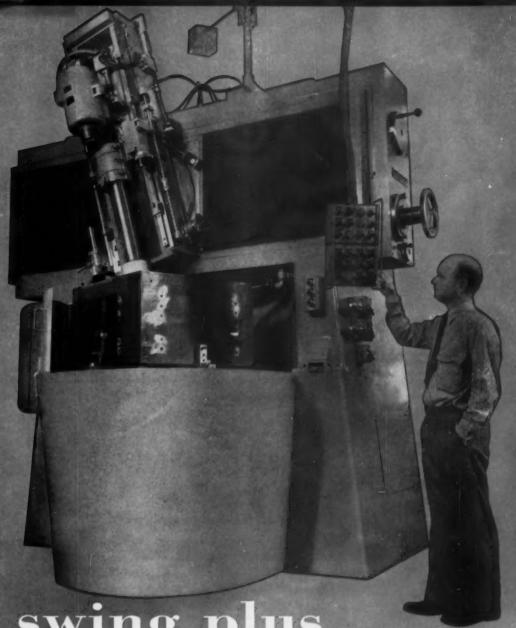
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52" swing plus...



... plus 27½" grinding head stroke, 24¾" clearance over face plate, 42" diameter face plate—on Springfield's new Vertical Universal Grinder. Work piece on the grinder here is a washing machine agitator mold, 43" corner to corner. One angle setting of the head ground both male and female taper for a perfect fit. Hand-lapping them would take a week. Springfield's time: 4½ hours.

Other Springfield Vertical Universal Grinders—swings 21" and 30". Lathes—toolroom, engine, contouring, reproducing—14" to 32".

Write for the name of your nearest Springfield dealer.

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Choose the RS Exact Motor You Need

INDUCTION

Tube-type TEFC squirrel-cage motor **Performance Characteristics**

Single or multi-speed. Wound-rotor design for variable speed operation. Available with low starting current, high starting torque and other special characteristics.

Protection

Applications

Open; drip-proof; splash-proof or weatherprotected; enclosed, self or forced-ventilated; totally-enclosed, fancooled: totally-enclosed, water-cooled; explosionproof.

Fans, blowers, machine tools, pumps, material handling and auxiliary equipment, compressors, m-gsets, general purpose use. Wound-rotor for variable speed where speed range is not too great.

SYNCHRONOUS

Performance Characteristics

Protection

Applications

Drip-proof synchronous

Constant speed under

all load conditions. Excellent for low speed. High efficiency under all loads. Unity or leading power factor.

Open; drip-proof; splash-proof or weatherprotected; enclosed, self or forced-ventilated; totally-enclosed, fan-cooled; totally-enclosed, water-cooled; explosion-

Can be used for almost any type of constant speed drive. Frequently used where power factor correction is necessary.

DIRECT-CURRENT

Performance Characteristics

Protection

proof.

Applications



Force-ventilated dc motor

Stepped or stepless wide range speed variation. Reversing or non-reversing. Dynamic or regenerative braking.

Open; protected; drip-proof; splash-proof; forced-ventilated from attached or separate blower; enclosed, watercooled.

Rolling mills, processing lines, wire mills, ma-chine tools, and other machines requiring wide range of speed adjustment with constant and variable torque and horsepower.

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The Iron Age Newsfront

Blast Cupola Has Zero Metal Loss

A metallurgical blast cupola is now being used in this country to produce molten iron from 100 pct steel scrap. Conventional cupola metal loss of 2 to 8 pct is reduced to zero. A high reducing atmosphere above the slag permits FeO content as low or lower than in a blast furnace. Carbon lined, with a permanent bottom, the blast cupola is economical and operates on a continuous basis.

Natural Gas Output to Expand

There will be considerable expansion of natural gas output this year, despite the uncertainty caused by the government's desire to control prices at the wellhead. Increase in natural gas output will at least match, probably exceed last year's expansion rate.

Titanium Alloys for Armor Plate

Although the use of titanium alloys for armor plate is still in the experimental stage, sufficient progress has been made to suggest the possibility of its use in lieu of rolled, homogeneous steel plate on an equal thickness basis. If successful it would result in weight savings up to 40 pct.

X-Ray Spots Engine Troubles

Trouble inside a closed, running engine can now be spotted from the outside by the National Bureau of Standards. A powerful X-ray unit is aimed at the engine. The X-ray pattern is converted into a visible light pattern, and the result is a television picture of moving parts in the engine.

Automate Heat Treat Unit

A new, compact heat treating unit, built to fit into an automatic production line, hardens, washes and draws small bearing components in a minimum of floor space. It automatically heat treats 20 lb of inner and outer races per hr, takes up 3 x 10 ft floor space and is 4 ft high. Inner and outer races are treated at the same time without mixing.

Consumers Will Spend More in '55

New cars and better vacation are to get a big play from consumers this year. There will be more money to spend with personal income expected to rise by about \$12 billion. Government experts see strong signs of overall good business for the next 12 to 18 months.

Plain Carbon Steel for Furnace Retorts

Bell-type furnaces recently put into operation by one steel company for annealing steels at temperatures over 2000°F are equipped with plain carbon rather than high alloy steel retorts. Successful use of the material in this application is due to the fact that the furnace atmosphere prevents oxidation and plain carbon properties are sufficient to meet strength requirements.

Chip Handling System Pays Off

A self-contained chip crusher, oil extractor and air-operated chip handling system is substantially lowering costs for one automatic screw machine user. The system recovers 1200 gal more of cutting oil per week than previous chip washing and oil salvaging methods. Better maintenance and shipping methods are also made possible.

How to Cut Paper Work

By combining a simplified, easy-to-use technical classification with a fast, efficient punch card system, Cadillac Motor Car Div. is able to locate in a few hours all available data on a particular material. Ferrous, nonferrous and miscellaneous materials are included.

Weld Ti Without Filler Rod

One of the big problems in welding titanium—atmospheric contamination—has been licked by one firm. By not using filler rod, the argon shield remains uninterrupted and is more effective. Other factors such as joint design, backup and clamping have been studied in terms of expanding the use of this method.



Even for the rugged, precision-built Bellows Air Motor, that's quite a record. But when Bob Daniels, Chief Engineer for Maugus Mfg. Corp., Needham, Mass., gave us the figures he was merely making specific what most users of Bellows Controlled-Air-Power Devices know — that, dollar for dollar, there's not better built air equipment made.

But maintenance saving is the least important part of this story. Bob Daniels designed the machine illustrated, to roll flat pieces

Have you seen OPERATION PUSHBUTTON?

New 16 mm sound movie shows how industries all over America use "Controlled-Air-Power." We'll be happy to arrange a showing for you. Write Dept. IA 355.

of tin into tubing for brush handles. Two Bellows Air Motors form the heart of the unit. It cut the cost of forming tubes 75% — increased production from 5,000 pieces to 20,000 a day.

This is another typical example of the cost saving possibilities you can obtain with the Bellows Air Motor — the air cylinder with the built-in valve. Any manual repetitive push, pull or lift movement can be performed faster, safer, and at lower cost with this unique air cylinder.

The Bellows co.

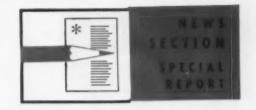
Akron 9, Ohio

IN CANADA

Bellows Pneumatic Devices of Canada, Ltd., Toronto

1106A

CONTROLLED-AIR-POWER FOR FASTER, SAFER, BETTER PRODUCTION



SHIPBUILDING: \$500 Million Available

New programs stimulate lagging shipbuilding industry . . . Probe by Congress likely to be tied in with appropriations . . . Carrier of big Forrestal class included in plans—By N. R. Regelmbal.

• SHIPYARDS will soon be stepping up their demands for steel, for nonferrous metals, and for machinery as the full force of the government's regular and "emergency" ship construction programs takes effect.

Although a kitty of several hundred million dollars has been available to the Federal Maritime Administration for matching payments on various types of ships, the money has only been trickling out to the shipyards.

Indications now are that government contracts are going to be coming out of Washington at an increasingly rapid pace.

Effect of the speed-up could be increasing pressure on the already

tight steel market if it comes before next fall. Steel plate mills,
in the doldrums for many months,
recently began stepping up production in anticipation of heavy
demands for line pipe from oil
and gas producers planning large
expansions. And chances are
good that the railroads and their
suppliers will be increasing their
demands for steel during the next
few months.

The shipyards, with about \$500 million to spend in the next year or so, will continue to demand steel for some time at a good clip, and may tend to stabilize the steel market this fall if other customers trim their sails.

Shipbuilding has been one of the slowest moving industries since the end of the Korean War. The first contracts for new oceangoing ships in about two years were placed late last year, and the first contracts for strictly non-military ships since 1940 won't be let until late in 1955, maritime officials say.

In the current fiscal year, Congress appropriated \$82.6 million for matching funds for merchant marine projects. Combined with a good portion of the Navy's \$663 million shipbuilding fund which will be spent in private yards, and private investments to match government funds, total money available to private shipyards now tops \$400 million.

For the fiscal year beginning next July 1, President Eisenhower

How Much Steel in a Passenger Ship?



OUTFIT	NET T	ONS	HULL	NET TONS	MACHINERY	NET	TONS
DOORS, HATCHES AND PORTS JOINER WORK REFRIGERATED SPACE PIPING VENTILATION MASTS, SPARS AND RIGGING STEERING GEAR		425 400 95 420 391 92 37	PLATES SHAPES BARS PIPE FORGINGS STEEL CASTINGS	8,480 1,610 153 59 14 114 TOTAL 10,430	MAIN TURBINE AND REDUCTION GEAR BOILERS MAIN CONDENSER PUMPS GENERATORS PIPING		515 500 32 63 87 282
ANCHOR GEAR MISCELLANEOUS	TOTAL	875 2,925	TOTAL STEEL REG S. S. INDEPENDENCE		SHAFT BEARINGS MISCELLANEOUS	TOTA	562 L 2,621



REFITTING Navy tanker, *Pioneer Valley*, Todd Shipyards, Alameda, Calif., fabricates complete new bulkheads. Plate is supplied by Kaiser Steel. Some 800 tons of plate and structural steel will go into ship, which is one of 400 built during World War II or right after.

is asking \$103 million—\$20 million more than this year—for new merchant ships, which with private matching funds will mean close to \$250 million for this type of construction. In addition, the Navy is asking almost \$200 million more than last year for its ship construction and repair program, most of which will have to be spent in private yards.

Increased spending in Navy shippards will mean the government, as well as private industry, will be entering the steel market this spring or summer.

Sen. Warren G. Magnuson, D., Wash., new chairman of the Senate Interstate and Foreign Commerce Committee, will act as a catalyst to accomplish the steppedup shipbuilding program, if present plans hold. He has taken over chairmanship of the subcommittee which handles merchant marine matters, and there are hints from his staff that there are eye-opening investigations brewing.

The senator plans to open hearings on the merchant marine program in about a month. First on the planned agenda will be officials of the Maritime Administration, including (probably) former Administrator Louis S.

Rothschild, who will be asked to explain about industry complaints that the agency is "dragging its feet" in spending the money Congress has made available to keep private shipyards operating.

"We have enough enabling legislation to put the shipyards back on their feet and keep a strong mobilization base," a subcommittee spokesman told THE IRON AGE. "What we need now is more efficient administration of the program and more appropriations to implement some enabling acts."

As an example, the spokesman points out that one section of the maritime law permits the government to insure up to 77.5 pct of mortgages on subsidized ships, and from 80 to 87 pct of the mort-

gages of nonsubsidized ships. Yet this provision (Title II of the Maritime Administration Act), has never been used, he says.

The subcommittee is also going to ask why 15 high-speed tankers which Congress authorized last year to be built in private yards and leased to the Navy have not been started. The lawmakers, the spokesman says, are pleased with President Eisenhower's maritime program for fiscal 1956, but are fearful that backlogs built up under this year's program will result in a pile-up which could be dangerous in case of an emergency. And the lagging is not helping the shipyards to the extent Congress planned.

The President wants \$14 million for three new passenger ships; \$11.5 million for conversion and reconditioning of two ships; \$23.5 million for construction of three prototype ships and a similar amount for replacement of five cargo ships; \$23 million for 10 new tankers under the "trade-in-and-build" program, and \$5 million for research, presumably to develop an atomic engine for installation in a Liberty ship.

Includes Giant Carrier

Navy's requests include \$50 million for new ships and repairs for the Military Sea Transport Service: \$30 million for new high-speed tankers and \$6 million for repairs to the reserve fleet. The military ship construction program includes funds for a new super carrier of the Forrestal class.

Where Government Maritime Funds Go

FISCAL 1955 (Appropriated)	FISCAL 1956 (Requested)	
FUNDS	FUNDS	PURPOSE
\$44,500,000 3,800,000 22,200,000 11,100,000 1,000,000	\$ 14,000,000 11,500,000 23,000,000 5,000,000 2,300,000 23,500,000 23,450,000	New Passenger-Cargo Ships Conversion and Reconditioning Tanker Trade-In and Build Research and Development Administrative and Warehouse Construction of 3 Prototype Replace 5 Cargo Ships
\$82,600,000	\$102,800,000	TOTAL

Maj. Gen. P. W. Smith

U. S. Not Ready For Emergency

Air Force general tells The Iron Age it would take 2 years to get aircraft production moving at pace needed to meet war need... Wants dual purpose plants.

Q. In view of our World War II experience and the Korean build-up, do you feel we could swing quickly into aircraft production in case of a new emergency?

A. No. "Swing" is just too effortless a word for it. Two years is about the minimum production build-up time for the new weapons.

Q. Why would it take so long?

A. The tooling up time alone has increased in direct ratio to the performance requirements of present day planes. In World War II we had a substantial breathing spell and far simpler and more standardized weapons in volume. Notwithstanding these advantages, every plane that flew in that war was at least on the drawing boards before the war began. Our experience in 1950 with production for the Korean conflict is our best criterion of present day realities. It's just possible that in any emergency we could squeeze a token dribble out of some production lines in 18 months. But this is the best time to face the fact that in the event of a sudden emergency we are going to have to depend on the production facilities which we have in being at the time the blow falls.

Q. What was our experience in meeting aircraft production goals following Korea?

A. It was not the sort to produce much optimism. As our first real test of mobilizing production for supersonic airpower, it was a lesson to both the Air Force and industry. As late as 1952 we were still getting serious slippage on vital production schedules.

Q. What steps should be taken to avoid a repetition of these failures?

A. I think both the Air Force and industry are agreed that there must be a continuous program of industrial planning. The Government and the Air Force have to assume a certain responsibility for keeping defense industry from being starved out again at it was after World War II. And industry has to help itself by developing flexibility and resourcefulness in adjusting the balance of defense and civilian production to some inevitable fluctuation of defense requirements.

One solution is the "dual purpose" plant with facilities for both defense and civilian production and the capacity to shift the major emphasis to whichever the situation demands at a given time. In addition, we have to try and forestall critical shortages in vital production equipment. In spite of World War II machine tools which we had stored, this was one of our bottlenecks in the mobilization for Korea. The Air Force was recently allocated \$84.5 million for the purchase of certain long lead time machine tools. Of course, this is only a very small percentage of the total investment required to modernize industry for production of highly machined aircraft and missiles of the present and future.

Q. Some of the other services do a good deal of production engineering in arsenals, etc. Does the Air Force feel that this practice would speed production planning—assuming it



Maj. Gen. P. W. Smith Comptroller U. S. Air Force Materiel Command

could get the funds for such work?

A. No. We must depend on industry, for its own good and ours, to function with the stature of a full partner. Our primary business is defense. Industry's is production. Industry can unquestionably outbid us for the top talents in this field and that's the way it should be. We see no point in attempting to split up the available manpower.

We believe very strongly that one of the main strengths of our industrial capacity for national defense is the initiative within industry to move forward on its own, improve its own product. In the final analysis valid production engineering can be done in only one place—at the manufacturer's own plant.

Q. What other steps is the Air Force taking to reduce the time lag between design and volume production?

A. We are doing more intensive testing on a larger number of prototype airplanes to get operational production models sooner. You might say we are trying to make haste slowly in the critical prototype stage to cut down as much as possible "retroactive modifications" which tend to slow down quantity production later.

IRON ORE: New Sources Start Producing

Imports from Labrador, Steep Rock and Venezuela all will show big increases this year . . . Mesabi will still provide 80 pct of supply . . . Taconite gains as Ungava looks to Europe—By T. M. Rohan.

◆ ENGINEERING crews of Great Lakes ore carriers boarded the ships this week preparing to open the 1955 shipping season by April 4. With steel production at near capacity and current ore stocks about 24.5 million tons compared to 30.5 million a year ago, a 75 to 78 million ton year is in prospect.

But in addition to traditional shipments from the Mesabi range, which accounts for about 78 pct of U. S. consumption, ore shipments from newly developed sources will show substantial gains in the coming year. Shipments from Labra-

dor, the Steep Rock area north of Minnesota, Venezuela, and increased tonnages of taconite are becoming a factor in U. S. steel production.

This year's output of about 7 million tons of Labrador ore to be mined by Iron Ore Co. of Canada has been spoken for. Last year the Labrador output was only about 1.7 million tons.

Venezuelan ore from U. S. Steel's Orinoco operation will hit about 5 million tons this year compared with 3 million in 1954. Most of this ore will go to the Fairless Works, Tennessee Coal and Iron Div., and some export tonnage. About 100,-000 tons will be sold this year to Sharon Steel Co. and Pittsburgh Steel Co. The ore comes by ship to Baltimore, then by rail to Pittsburgh.

Output from the Steep Rock area this year will be about 2.5 million tons compared to 1.1 million last year. A neighboring ore claim has been leased to Inland Steel Co. which expects to invest \$50 million to produce 3 million tons annually. Steep Rock's own target is 5.5 million tons per year.

Taconite tonnage from Minnesota this year will probably hit over 1 million tons. Farthest ahead is Reserve at Silver Bay, jointly owned by Republic Steel Co. and Armco. Full capacity operation at a rate of about 3.75 million tons annually will be hit late this summer. When Erie Mining Co. and Oliver Mining Co. taconite projects hit full steam about 1957, output will start climbing toward the projected 30 million annual tons with investment of \$1 billion.

Look to Seaway

The Labrador operation north of Seven Islands will reach important proportions for the first time this year.

About 1 million tons this year will go through the St. Lawrence waterway on small ships, but economic advantage of the deposits will jump markedly on completion of the waterway development. Investment has topped \$250 million and it is expected the project will be capable of yielding designed capacity of 10 million tons annually by the end of this year.

Iron content of Venezuela ore is running about 58 pct Fe natural with under 1 pct silica. Thus it is

Ore Shipments Will Be Up in '55



blended easily with Mesabi ores running 9-10 pct silica for an ideal blast furnace charge of 4-6 pct silica.

Study European Market

Sharon Steel Co. is currently running one blast furnace exclusively on Venezuelan ore and has increased its order over last year. Testing is being done on blending the ores with Lake Superior types.

The Ungava Bay area may find its ultimate market in Europe. Cyrus Eaton, Jr., told The Iron Age last week he had just returned from Europe where "prospects look promising for some long term tonnage commitments." Mr. Eaton said contrary to popular conception, the Ungava's main market lies in Europe rather than North America.

Almost all reserves are within a 6-mile distance of tidewater. Excellent natural harbors are available and there is also heavy hydro-electric potential. Although the ore runs in the low 40-45 pct Fe range, it is easily beneficiated. Ungava Bay has only a 4 months' shipping season, but ore can be shuttled to Greenland during the season, then hauled to Europe during the remainder of the year.

Mesabi Still Strong

"We have received firm proposals and costs on this arrangement and it looks like it will be as economical as moving direct to Europe during the short season," Mr. Eaton said. "Our main competition will be Norwegian and Swedish mines. These grades are high, but also high in phosphorus content." First shipments are expected to start in two years.

In spite of the ore from these new sources, the Mesabi will continue to furnish up to 80 pct of the ore for U. S. mills. This year it will mean an output of nearly 78 million tons. Last year shipments were about 60 million.

Target 80 Million

Although start-of-season stocks are lower than last year, the current tonnage of 24.5 million tons is not particularly low. Stocks have been as low as 10 million when shipping started so there is no particular pressure for an early start by most shippers.

A. C. Brown, board chairman of Cleveland Cliffs, told THE IRON Age that in 1953 Lakes shipments were almost 100 million tons and in nine of the past 15 years the total was over 80 million. He predicts that figure this year.

As the ice in the Lakes began to soften and break up, signs of activity appeared at the docks where ore carrier fleets were moored for the winter.

The 59-ship fleet of Pittsburgh Steamship Div. of U. S. Steel will proceed to Lake Superior to open the season April 4, weather and ice conditions permitting. Engineers of the fleet started to board ships March 16 while deck officers will go aboard March 22.

Ore Imports:

New York asks freight break to get bigger share

Iron ore imports will be monopolized by Baltimore and Philadelphia unless the government revises freight rates for railroads serving those ports and New York, the Port of New York Authority warns.

Total shipments of foreign iron ore into U. S. ports may soon reach 20 million tons, the port authority says in a new brief filed with Interstate Commerce Commission. Aim of the New York group is to get ICC action that will insure a sizable share of ore business for the port it represents.

That portion of ore imports now



"Do you inhale?!"

handled by New York is disappointing to the port authority. In the first five months of 1954, the brief contends, only 89 tons cleared through New York, while Philadelphia received more than 1 million tons and Baltimore more than 2.5 million tons.

More Imports for New York

It is admitted that a large amount of the tonnage imported in the two latter cases was consumed at the Fairless plant of U. S. Steel and the Sparrows Point facility of Bethlehem Steel. Chief concern of the port authority is with ore moved by rail to points as far inland as Pittsburgh and the midwest. New York is unwilling to build unloading facilities unless it gets a guarantee of rate equality.

A change in current rail rate structure would allow New York an equitable share of imports, the brief contends. It asks ICC to find rates governing the New York railroads just and reasonable, and those for roads serving the competing ports unjust and unreasonable. Both rates became effective in February, 1953.

Up Prices:

Firm price system returns as ore prices get boost.

This year's slight increase in Lake Superior iron ore prices was led off by Oliver Iron Mining Div. of U. S. Steel. In late February the firm privately informed certain long term customers of its intention to raise base prices 20 cents per ton. Shortly thereafter Cleveland Cliffs Iron Co., traditionally the first announcer, announced comparable increases on its price.

Firm Quote Returns

One unusual aspect of the price set-up this year is the return of the firm price quotation for the first time since price controls were instituted. Industry sources indicated this year's quotations are firm because little chance of a freight rate change is seen. Before World War II prices were quoted without adjustment for transportation and subject to change.

SMALL BUSINESS: Gets Helping Hand

Government agency keeps small firms posted on U. S. buying . . . SBA help has brought \$132 million in contracts during past 6 months . . . Most companies classed as small business—By D. G. Picinich.

◆ SMALL BUSINESS management is giving increased attention to the expanding role played by Small Business Administration (SBA) in helping small contractors keep abreast of proposed government procurement. In approximately 18 months of operation, more than \$400 million in military orders have been set aside under a joint SBA-Defense Dept. program to increase the small business share of defense orders.

Under the program, more than 2600 contracts have been awarded, amounting to about \$180 million (See The Iron Age, Feb. 3, p. 75). In addition, SBA's 14 nationwide field offices have made available to small firms 181,000 notifications of military and civilian agency prime contract opportunities. In the past 6 months, these notifications have resulted in contract awards totaling more than \$132 million.

Created by the 83rd Congress under the Small Business Act of 1953, SBA has two primary functions in serving small business: contract assistance and loan assistance. For contract award purposes, SBA places firms employing fewer than 500 persons in the small business class.

If yours is a "small business" within this definition, chances for getting contract assistance will be good if you meet the following evaluation standards for SBA's certificate of competency: (1) yours is the lowest responsive bid on an advertised purchase or is within price range on a negotiated purchase; (2) the contracting agency's procurement officer has okayed your firm's financial ability and productive capacity with respect to the particular contract you are applying for, and (3) SBA's investigation of your financial status clearly indicates your firm can handle the contract in question.

Certificate of competency is normally issued by the local regional office and procurement officers are directed under the 1953 Act to accept SBA's determination as conclusive.

Will Make Loans

SBA makes available to small companies needing financial aid two types of loans: business loans and/or disaster loans. Business loans are made to finance plant construction or conversion; expansion or purchase of equipment, facilities, machinery, supplies or material. Disaster loans cover damages to small firms or homes resulting from floods or other catastrophes.

Present business loan maximum is \$150,000 per applicant, carries 6 pct interest, and has a maximum 10-year repayment period. Current legislation before Congress seeks to boost this limit.

Present legislation calls for SBA's expiration effective June 30, but Washington experts predict a minimum 1 to 2 year extension will be voted. Whether the requested business loan hike will be granted in full is not certain, but it is believed that the \$150,000 current ceiling will be raised substantially.

Approximately 15,000 procurement assistance inquiries have been received by SBA field offices in the past 6 months. These have been mostly from firms wanting to know which government agency buys products or services they can supply. In addition, more than 4000 small firms have been aided by SBA in bidding on specific government purchases by having their names placed on temporary bidder lists.

How to Use SBA

For Aid on Government Contracts:

- Register your production facilities with local Small Business Administration office on proper SBA forms.
- Once registered, SBA will notify you of current bids suitable for your company.
- Discuss with SBA regional office which bids open are most suitable for your business.
- Write to: Small Business Administration, Washington 25, D. C., for latest information on additional contract possibilities.

For Loans:

- 1. See if you can get a bank loan first.
- If bank will not OK loan, contact your local SBA office. (Be sure to have available your latest financial status.)
- SBA will thoroughly investigate your needs. If you qualify for assistance, the local office will process your application for clearance and action.

EDUCATION

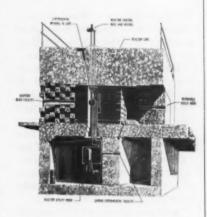
ATOMS: Plan Private Reactor

Will be used by private industry for non-military uses . . . At cost of \$500,000, it will be built by North American Aviation for Armour Institutes.

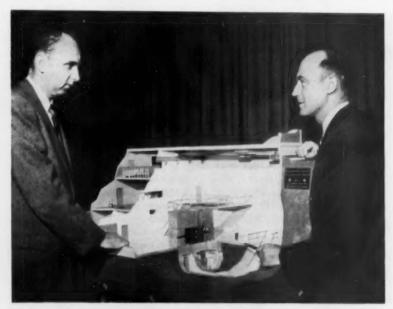
• FIRST NUCLEAR reactor designed for private industrial research will be built for the Armour Research Foundation by North American Aviation, Inc.

The new reactor is to be located at Armour's operations on the campus of the Illinois Institute of Technology in Chicago, not far from the site of the historic Stagg Field reactor.

Scheduled to be completed in about a year, the reactor will be available to industrial and government sponsors to conduct a wide range of nuclear research. Capable of operating at a power range of 50,000 watts, the reactor will produce neutrons and gamma radiation for research and development in fields of metallurgy, machinery, electronics, food processing.



SKETCH of private industry's first nuclear reactor. Atomic fission, taking place in the reactor core, produces useful neutrons for many research projects.



REACTOR for industrial research. Dr. R. Loftness, left, and Dr. H. Pearlman, scientists, study a model of the reactor which will be located in a room about 48 ft long, 72 ft wide, and 30 ft high. Atomic fission will take place in a steel sphere reactor core.

Engineers:

Salaries and job offers are good for new graduates.

This will be another good year for engineering school graduates. Competition in industry for available engineers is stronger than ever, according to the experience of Stevens Institute of Technology, Hoboken, N. J. Other schools could duplicate the Stevens report.

The engineering school reveals that more than 170 companies will have their talent scouts visit the campus this spring to interview 128 students scheduled to graduate in June.

The students will be able to pick and choose from job offers from such companies as Alcoa, Bell Telephone, DuPont, General Electric, General Motors, U. S. Steel, and Westinghouse.

Salaries Up

Stevens estimates the prospective graduates will participate in about 2000 interviews for an average of over 15 interviews each. Many of them will have jobs lined up well in advance of graduation.

Salary offers will be \$10 per month over last year's record average of \$360. Some starting salaries will run as high as \$440, perhaps higher. Nonetheless, few of the students choose their jobs entirely on the basis of salary. "Fringe" considerations such as training programs, chances for advancement, and future of the industry are important, and company recruiters stress these advantages.

Although Stevens graduates receive the degree of Mechanical Engineer, alumni of last year's class are working in every major branch of engineering and in many different types of industries—another indication that the demand for engineers reaches into many fields.

Most of last year's graduates obtained jobs even before receiving diplomas.

SCRAP: National Export Barriers Rise

U. S. shipping rules tighten as Europe faces dangerous pinch . . .

ECSC plans tie-in sales . . . Will get scrap for steel . . . Red nations counter with similar move . . . Scrap trade favors open end shipping.

 WORLD-WIDE restrictions on scrap exports are being imposed in all corners of the globe as individual nations seek to keep iron and steel scrap at home for their own domestic steelmaking.

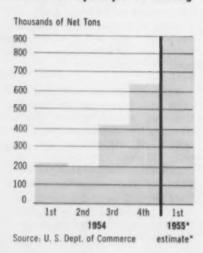
New U. S. restrictions on the export of iron and steel scrap were clamped on last week by the Federal government. The Bureau of Foreign Commerce of the Dept. of Commerce, ruled that would-be exporters must submit copies of their onboard bills of lading in order to qualify for a new type, one-shot, export license.

The new licenses are being doled out by the BFC on a cargo-by-cargo basis to firms that actually made shipments from the U. S. on or after Feb. 21, 1955. The license is valid "for a single shipment of material on a single carrier only."

East Against West

Government officials said they tightened the rules because shipments in the past three months have been at a peak rate of 300,000

U. S. Scrap Exports Rising



tons per month. This compares with a total export of 1.5 million net tons in 1954, which itself reflected a sharp increase over 1953.

Meanwhile, European sources reported tightening measures by the European Coal and Steel Community as well as competitive moves on the part of the Eastern bloc to obtain scrap for its own mills and to attract scrap from other areas. The threatening world-wide scrap shortage was first discussed by The Iron Age (Jan. 20, 1955, p. 42).

In Europe, the ECSC has not permitted any scrap to leave the orbit of its common market since the first of the year. Nevertheless, more aggressive methods are necessary if the ECSC is to import the 2.6 to 2.8 million tons of scrap it believes it will need by 1957.

Offer Inducements

One method by which the ESCS can assure itself at least a moderate supply of scrap is through tie-in sales of a type. In this plan, ECSC members exporting steel will insist on scrap in return for steel shipments.

To attract scrap from outside the community, a system of prices under which buyers supplying scrap to the ECSC will enjoy preferential prices or delivery terms is being formulated. This could work under the current sellers market which now exists for the ECSC.

But the ECSC faces competition from the East. Russia, Romania, Hungary and other Eastern bloc countries have announced a huge buildup for more steel production, and more scrap buying. The USIA Vienna, the Russian controlled Austrian industrial corporation, has announced that "such merchants which will supply more scrap to

the USIA will get special terms in dealing with Russia and the Eastern bloc in many other items."

The East either copied or anticipated ECSC scrap procurement methods. The Austrian steel industry has already announced that further expansion of steel output by 25 pct depends on obtaining enough scrap, a goal that may be periled by the USIA methods.

European sources predict that in 1955 or 1956, most countries will in one way or another stop selling scrap freely and reserve their supplies for predetermined sources. One step is anticipated in an Eire and Great Britain agreement while Burma is already negotiating with Moscow.

Want Open End

On this side of the Atlantic, the Dept. of Commerce last week called in representatives of both the scrap industry and steelmakers. Sinclair Weeks, secretary of Commerce, is believed to be opposed to export controls.

The scrap industry favors open ending of scrap exports as long as exports of complementary raw materials, iron ore, pig iron, semifinished steel, as well as finished steel, are not restricted.

In Washington last week scrap people maintained there is no shortage, but say there may be a shortage at current price levels. It's a supply and demand situation, they argue.

At a recent meeting of the Business & Defense Services advisory committee on scrap, a proposal was made that beginning April 1 qualitative controls be considered to permit each export shipment to contain a minimum of 30 pct No. 2 bundles and a maximum of 30 pct No. 1 bundles. No more sessions were scheduled before March 31.

GREAT BRITAIN: Boosts Steel Program

Expansion to meet rising home need . . . Step up exports . . . lessen reliance on imports . . . 24.6 million ton capacity by '58 . . . May go higher . . . \$700 million already committed for buildup—By F. H. Harley.

• GREAT BRITAIN is pushing an expansion program to meet future steel requirements.

The program has a threepronged objective: (1) to meet increased domestic needs, (2) to step-up exports, (3) to lessen Britain's reliance on imports.

The Iron and Steel Board's report to Parliament envisages a capacity of 24.6 million ingot tons—perhaps more—by 1958. The industry already is committed to spend \$700 million. Expenditures since 1953 may reach \$840 million. Plans for 1960 are in an early stage of development.

Projected 1958 capacity compares with expected 1955 production of 23.4 million tons. In 1953 production was 19.7 million tons. Last year's output was an estimated 20.7 million tons.

Per Capita Use Up

Motivating the industry's expansion program are: (1) assumption that capital investment will increase 5 pct per year, (2) greater demand for autos and other consumer durables, (3) an expanding export market, (4) defense needs remaining on an even keel.

Added incentive has arisen from Britain's all-time per capita steel consumption record reached in 1953. Apart from the U. S., Britain was the only major producer to consume more steel per capita than in 1952. Prior to 1953, the United Kingdom was topped by the U. S., Sweden and Canada.

When the program is completed, finishing capacity increases since 1953 will include an 85 pct rise in tin plate; a 50 pct boost in sheets; and a near-40 pct advance in tubular products—a total of 2 million tons. Capacity increase for other products totals another

2 million tons of steel output.

To support the rise in ingot capacity, pig iron output will be up to 17 million tons by 1958. This compares with 12.5 million tons in 1953. More home scrap will be generated. If necessary, some pig iron will be imported. Coal, domestic and import ore requirements, and shipping facilities will be expanded in keeping with the increase in steel production.

Modernization of present steel production facilities is receiving serious attention. Considerations include updating the pig iron industry particularly in hematite and foundry iron manufacture. This would include expansion of supplies of low phosphorus foundry pig iron. Adding 4-high plate mills to meet increased demand for wide thin plates is also being considered.

Other blueprint planning takes

in the need for additional continuous strip mill capacity and modernization of semi-finished steel production. Further updating in lighter mills, especially those producing alloy and special steels, is planned for the near future.

Great Britain's rise in per capita steel consumption resulted from a general relaxation of domestic demand in other countries. This decline may be noted in the accompanying table which is based on British Iron and Steel Federation estimates. The figures are arrived at by adding the ingot equivalent of imports to each nation's steel production and then deducting ingot equivalent of exports for the given year.

No allowance in the tabulations is made for inventory changes except in the case of the United Kingdom.

Breakdown on Per Capita Steel Use

(In ingot Ibs)

		1		
	Average 1937-8	1951	1952	1953
U. S. A.	640	1,342	1,134	1,373
Great Britain	493	653	701 .	704
Canada	336	793	732	698
Sweden	532	709	777	704
Australia	428	677	688	547
West Germany	600	498	661	652
France	289	397	524	414
Belgium-Luxembourg	353	516	518	465
Netherlands	333	417	398	447
Italy	123	165	186	191

Source: British Iron & Steel Federation.

TITANIUM: Needs Government Help

New industry needs research, quantity orders for trial runs, market development . . . Government could protect own investment in industry . . . Orders are at low point—By T. M. Rohan.

* A FOUR POINT program for government cooperation with the titanium industry to help it over some of its current rough spots was proposed last week by John H. Garrett, Washington, chairman of the Defense Department's titanium steering group.

Speaking at an open house at Mallory-Sharon Titanium Co., Niles, O., Mr. Garrett proposed:

- 1) Checking research and development for gaps and development of additional alloys to improve properties. Program would cost up to \$2 million per year for next 2-3 years.
- 2) Assistance to melting and fabricating portions of the industry through investigation of nonuniformity of product, sheet thickness variations, etc.
- 3) Placing of moderate sized production quantity orders to permit sufficient testing and development on actual runs by producers.
- 4) Assistance in developing market of several thousand tons monthly of standard quality titanium rather than all premium aircraft quality types.

Should Pay the Cost

He added the Defense Dept. is currently spending almost \$3 million annually on titanium research plus expensive aircraft engine testing using titanium parts.

James Roemer, president of Mallory-Sharon, said if the government would specify titanium for aircraft in more instances and pay the extra cost, the government's own substantial investment in sponge and sponge production facilities would be better served than in the revolving stockpile.

"What the titanium melters really need at the moment is orders," Mr. Roemer said. "It seems to us they could be forthcoming for we understand that on one aircraft now in production, 1 million lb of titanium sheet could be used if the Air Force were to specify titanium and pay for the increased cost.

New Facility

"Orders on the books are at a low point. This means there is time and manpower to do the job. It can be done better and cheaper under these circumstances than in time of emergency as we may be forced to do one of these days."

Occasion for the open house was completion of a new double melting facility and installation of a 3000 ton Hydraulic Press Mfg. Co. press for compression of sponge.

New facilities raise melting capacity to 1500 tons per year of titanium ingots produced by double melting in a vacuum using consummable electrodes.

Mr. Roemer said that quality has been so improved that material shipped three years ago would not be accepted today. He added that prices have dropped proportionately to the drop in sponge and may decline again this year although "there's no drastic reduction in the picture."

Of a government set-aside of 10 pct for civilian use, less than 2.5 pct is going to non-defense-rated orders. Quality is also improving by about 5 Brinnell points per quarter.

If progress in titanium in the next five years is equal to the last two, three new types of alloys will be available for production evaluation, L. S. Busch, Mallory-Sharon research director said.

Construct New Site

Westinghouse Electric Corp. will construct a combination office building and manufacturing plant near Friendship, Md. New construction will total 350,000 sq ft with 210,000 sq ft being devoted to manufacturing space.

Production of electronic equipment for the Defense Dept. is slated for January, 1956. The new building will provide space for about 150 additional engineers.



LIGHT ALLOY die forging, one of the largest ever produced in U. S., was the first off 35,000-ton hydraulic closed die press at Wyman-Gordon-USAF facility at North Grafton, Mass. It is a wing spar for new Convair interceptor.

Air Force orders fast tanker planes for sky refueling.

New Air Force orders for the Boeing KC-135 jet tanker, capable of refueling intercontinental bombers at more than 500 mph. have a value of approximately \$460 million.

Orders will be placed over an extended period as the new planes are brought in to replace the KC-97 tankers, which fly at only about 300 mph. This procurement is in addition to the \$240-million contract for the KC-135 let by the Air Force last summer.

Work Stays In U. S.

While the KC-135 now becomes the standard jet tanker, the Air Force indicates it is still looking for an even more modern design. It will place a Phase I contract with Lockheed Aircraft Corp. for design and development engineering of an advanced jet tanker.

Decision to award the new procurement contracts to Boeing Airplane Co. was made after the firm agreed to place a maximum of subcontracting work with U. S. companies.

No second source of the KC-135 is being sought, says Air Force Sec. Talbott, because the cost would be excessive and the delivery rate would not be substantially increased.

Pool Defense Skills

Legislation to create a "nucleus of unique and specialized skills" for defense and emergency needs is being readied by the Eisenhower Administration. Its purpose is to assure opponents of the reciprocal trade bill that vital skills will be preserved, and not eroded away by flood of cheap imported goods.

Secretary of Commerce Sinclair Weeks, testifying before the Senate Finance Committee on extension and liberalization of this country's trade-tariff laws, says the Office of Defense Mobilization is now reviewing the proposed legislation to set up a pool of defense skills.

The legislation would create an adequate reserve of skills "to pro-



COMBAT TANKS will not ride on wings of this Martin Seamaster. Trick photography has been used to show upward load applied to wings in test program.

vide the base from which production can be rapidly expanded to a wartime scale," the secretary says. He adds that the plan will be proposed as an amendment to the Defense Production Act. He is not yet explaining how the pool of skills would be established.

Put Plant in Shape

Seven production lines at the Alabama Ordnance Works, Sylacauga, Ala., are going to be put into top operating shape for the Army by Associated Contractors, a group of 4 Alabama and Kentucky firms.

Modernization of the lines, which will handle smokeless powder and other explosives, will cost the Army \$37.6 million. Work will require about 21/2 years, and some 4000 to 5000 construction employees will be needed when the project is in full swing.

Now on a standby basis, the ordnance works is to become an important link in the Ordnance Corps ammunition production chain.

Comprising the Associated Contractors are Dunn Construction Co., Birmingham; Blount Bros. Construction Co., Montgomery, Ala.: Patterson-Emerson-Comstock Co. of Alabama, Inc., Birmingham; and The Girdler Co., Louisville,

Will Start Carrier

Construction of the aircraft carrier Independence, a 60,000-ton sea giant which will house and launch more than 100 planes, will begin this summer at the U.S. Naval Shipyard, Brooklyn.

Fourth of the postwar supercarriers, it will travel at better than 30 knots and accommodate jet aircraft of the latest type. Its estimated cost is more than \$189 mil-

Four earlier U. S. naval vessels have carried the name Independence. Most recent of these was a World War II aircraft carrier which took part in a number of raids in the Pacific, as well as the second battle of the Philippine Sea, October, 1944.

Contracts Reported

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Bombsight, 10, \$428,621, Farrant Optical Co., Inc., New York, N. Y., George A. Dennis.
Brake assy., 1086, \$656,066, Bendix Aviation Corp., South Bend, Ind., G. I. Lyman. Turbo-jet airc engines, 69, \$1,395,870, General Motors Corp., Allison Div., Indianapolis, Ind., H. S. Bowden.
Wheel assys, brake assys, 667, \$318,920, Goodyear Tire & Rubber Co., Inc., Akron, Ohio.
Actuators, screwjacks and shaft assemblies, \$508,318, Chicago Pneumatic Tool Co., Detroit, Mich.
Engines tools, 149, \$476,140, Continental Motors Corp., Muskegon, Mich.

Steel:

Armco will put \$58 million into new facilities.

A \$58 million expansion program in sheet and strip including 360,-000 additional annual tons openhearth capacity was announced last week by W. W. Sebald, Armco Steel president.

Bulk of the expansion will go to the firm's Butler, Pa., mill in a \$25 million program including a new 56 in. hot strip mill, new annealing and pickling line, widening of the present slabbing mill and relocation of its railroad wheelworks on property now owned by Pullman Standard.

Add Openhearths

The Ashland, Ky., works will get a second reversing cold mill, strip normalizing and pickling line, new sintering plant and Ohio River shipping terminal at a cost of \$15 million.

Steelmaking capacity at Armco's home base in Middletown, Ohio, will be increased by 360,000 tons per year through addition of two 275-ton openhearths with provision for two more in an \$18 million program. The new openhearths will have continuous charging facilities in an extension of the existing new building.

A third continuous mill for coating with zinc or aluminum will also be added. Annealing capacity will be enlarged, a new coil temper mill and pickling lines added and ingot handling facilities improved.

Adds New Facilities

Lear, Inc., West Coast aviation products manufacturers, has completed a three-phase building development program at the company's five divisions.

New construction during 1954 totaled 198,000 sq ft. Plant facilities now total 536,100 sq ft. A 58,000 sq ft hangar has been erected at Grand Rapids, Mich. It will be used to install new products in aircraft for flight tests.

Sales, engineering and factory productian area was increased to a total of 10,600 sq ft at the firm's Elyria, Ohio, installation. The plant produces aircraft air and liquid pumps and cooling equipment for airborne electronic equipment.

The company's Santa Monica research and development divisions have been increased to a total of 72,000 sq ft. These turn out aircraft radio equipment and automatic flight stabilization systems. In addition, the aircraft engineering division has erected a 58,000 sq ft hangar at Santa Monica airport for production of business planes.

New Production Site

American Can Co. has begun steel container manufacturing operations in Denver. Firm's new one-story plant occupies 60,000 sq ft of floor space with annual rated production facilities for more than 125 million steel containers for



beer and food products. The new location provides space for a Rocky Mountain sales headquarters as well as manufacturing and warehouse operations.

Argentina:

South American firm gets \$60 million expansion credit.

Equipment, materials, and technical services needed in steel mill construction will be bought in the U.S. by an Argentine firm with a new \$60 million credit line from the Export-Import Bank of Washington.

This credit is opened to Sociedad Mixta Siderurgia Argentina, which intends to build an integrated steel mill at a deepwater port on the Parana River.

Has Finishing Mills

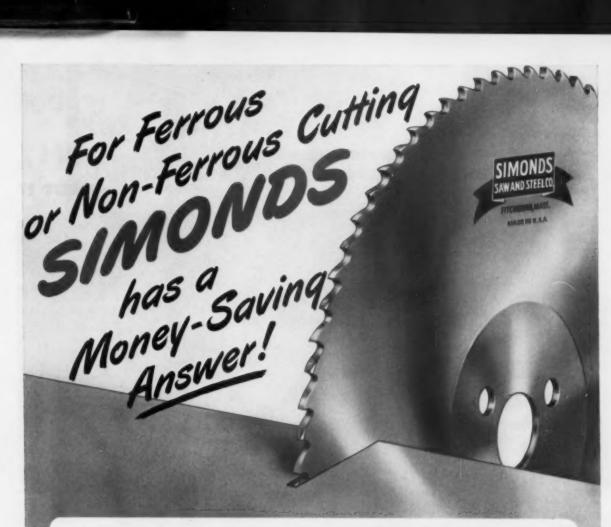
The company actually will spend an estimated \$100 million on purchases in the U. S. Balance of the cost will be paid from other funds available to the company or financed by credits opened by U. S. suppliers.

To be ready for operation by the end of 1958 the new plant will consist of a 1300-ton blast furnace, a by-product coke oven plant, openhearth furnaces, a blooming and billet mill, a rail and structural mill, and finishing mills for plate, strip, sheet, and tinplate.

New Site Plans

Atomic Energy Div. of The Babcock & Wilcox Co. has completed construction plans for a major plant site near Lynchburg, Va. Production will include manufacture of fuel elements and other reactor core components.

Initial construction of a onestory, 100,000 sq ft building will begin shortly. The structure will house laboratories, manufacturing equipment and offices.



It pays to pick the best blade for every cutting job. You get faster cutting, longer blade life and maximum saw performance, with fewer shutdowns for resharpening or replacement. Whether you're working with ferrous or non-ferrous metals, Simonds is one source that offers you a complete line of job-designed saws — the most wear-resistant, edge-holding saws for any type of cutting.

For non-ferrous cutting, Simonds offers you a choice of four basic types — Si-Maloy* Steel Saws, Semi-High Speed Steel Saws, High Speed Steel Saws, and Carbide-Tipped Saws — plus Inserted Tooth and Segmental design Saws.

For ferrous cutting, Simonds offers you a choice of three basic saw designs — Inserted Tooth, Segmental, or Solid Tooth... to provide a "best" blade for specific cutting applications.

For more information on which blade is best for your job, ask your local Simonds Industrial Supply Distributor who stocks them, or write for Simonds Circular Metal Cutting Saw Bulletins today.

*Steel Analysis Potented





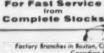






- A. Solid Tooth Ferrous Cutting Saws
- B. Inserted Tooth Saws
- C. Segmental Saws
- D. Solid Tooth Non-Ferrous Cutting Saws E. Carbide-Tipped







Factory Branches in Baston, Chicago, Son Francisco and Partiand, Oregos Conodian Factory in Montreal, Que. Simonds Divisions: Simonds Steel Mill, Lackport, N. Y.

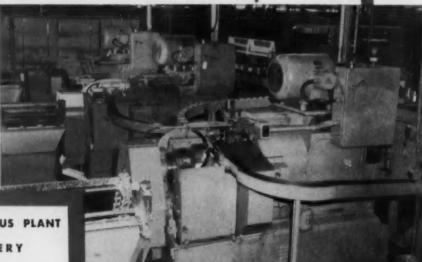
SAW AND STEEL CO.

FITCHBURG, MASS.

Circular Metal Cutting Saws

. . IF IT'S A HIGH PRODUCTION PROBLEM . .





ANOTHER WORLD-FAMOUS PLANT

OF BOIRD CHUCKERS

The photo above shows four of a battery of eight Baird 6-spindle automatic Chucking Machines performing the complete turning operations on aluminum alloy pistons . . . including automatic feed and discharge.

The Plant Manager says, "Previous methods of finish-turning required *four* separate operations. Now, the same results are attained in one operation . . . faster and with less chance of error." Cutting speed is 1332 to 1350 ft. per minute . . . feed per revolution .018 to .025. Actual cutting time at each station approximately 5 seconds . . . complete cycle 7.36 seconds.

Baird Chuckers are designed and built to insure positive, continuous, production . . . tooled for precision at low unit costs that give you a definite, competitive advantage.

As automation of large plants advances, Baird automatics can play a vitally important part in your production lines. And Baird engineers, highly experienced in special tooling techniques, offer you solutions for tough production problems. It will pay well to "ask Baird about it."

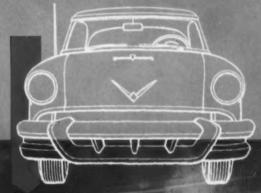
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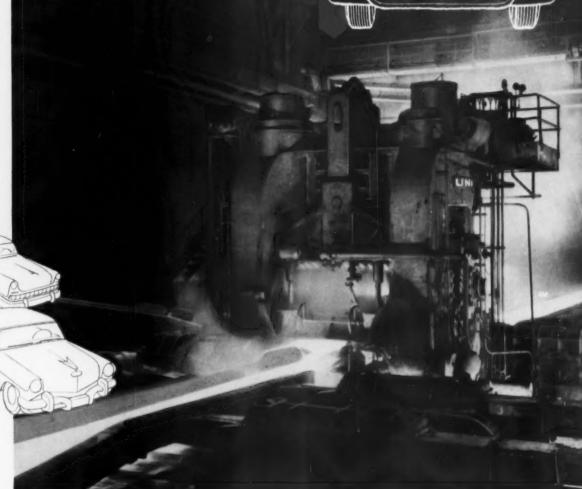
THE BAIRD MACHINE COMPANY
STRATFORD CONNECTICUT

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4-HIGH REVERSING **ROUGHING STA** HOT STRIP MILL





designed and built by

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ENGINEERING AND FOUNDRY COMPANY

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Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



(ACTUAL EXAMPLE)

THE PART

Chrome Plated Auto Grille Unit

THE STEEL

218,000 lbs. 21" x .036"—Soft Temper, No. 2 Reg. Bright Finish BLANK SIZE. 21" wide x 36" long

PRINCIPAL OPERATIONS

Blank, Draw, Restrike and Trim THE JOB-RUN...27175 pieces THE YIELD.....27055 pieces THE TIME.....February 1955

JOB PERFORMANCE 9956/100%

In citing this one example, we're not saying that DSC STRIP will give you the same near-perfect performance every time. We do say that over the long run, our product consistently meets or beats established standards for strip performance.

We invite you to test our 33 years of successful stripmaking experience. We know what our product can be expected to do when the tools, the job and the steel are properly mated.

Let's talk over some of YOUR nearby requirements. Just call your nearest DSC Customer Representative.



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GENERAL SALES OFFICE - DETROIT 9, MICHIGAN

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Chicago, Cincinnati, Columbus, O., Dayton, O., Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., New York, Richmond, Va., St. Louis, Toledo, Worcester, Mass.

YOUR GUIDE TO DSC MILL PRODUCTS

Hat Rolled and Cold Ralled Sheets
Cold Rolled and Hot Rolled Carbon Steel Strip
Cold Rolled High Carbon Spring Steel
Low and Medium Carbon Manufacturers' Wire
High Carbon Specialty Wire
Aluminum Cable Strand Reinforcement
Rope Wire Tire Bood Wire Welded Fabric

How RELIANCE Job-Gitting meets your requirements

Like our mill people, we in Reliance also work to supply steel that meets your job requirements.

The difference is this. Our mill people make the steel to your order. We pick-your-order from ready-made sheet and strip. For all practical purposes, the results must be about the same.

How do we meet the test? By getting the facts about the job . . . knowing from experience what the steel on hand can and cannot be expected to do . . . selecting what's best suited for your job in gauge, size, workability and finish.

That's Job-Fitting—The Reliance way.

Try us. Call your nearest Reliance
Customer Representative whenever we can be useful.



RELIANCE STEEL DIV. DETROIT STEEL CORPORATION

Processing and Distributing Plants

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DETROIT PLANT, Detroit 28, Mich., WEbster 3-5866
EASTERN PLANT, Hamden, Conn....State 7-5781
MIDWEST PLANT, Chicago 8, III....CAnal 6-2442

Reliance Customer Representative Offices

Dayton, O., Des Moines, Ia., Grand Rapids, Mich., Indianapolis, Ind., Jackson, Mich., Milwaukee, Wis., New York, N. Y., St. Louis, Mo., Toledo, O., Worcester, Mass.

RELIANCE Job-Fitted PRODUCTS

COLD ROLLED STRIP — Coils Cut Lengths All Tempers
SHEETS — Cold Rolled Hot Rolled Pickled
Galvanized Long Terne

Standard or Production Sizes
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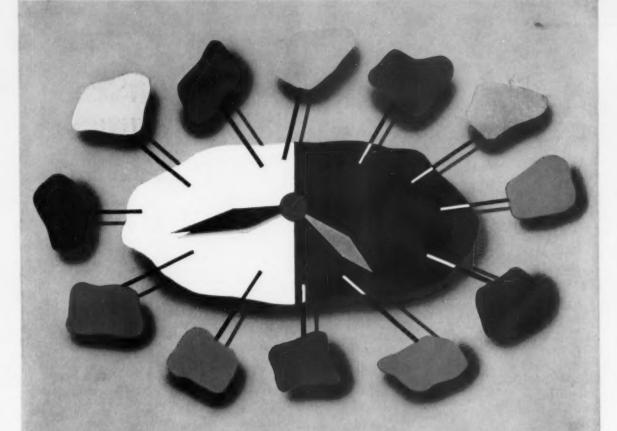
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chock-full of practical, press-working data for buyers, designers and makers of stampings. Send 50c to

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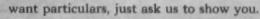
NATIONAL ASSOCIATION OF METAL STAMPERS, CLEVELAND 20, OHIO





measure of profit - or loss

Minutes purchased through payroll—and particularly the higherpriced minutes of skilled machinists—are identical in the cost column but not
always so on the profit and loss sheet. Axelson lathes have been designed
to give those precious minutes maximum value both in set-up
and running. In every type of work, Axelson lathes have
been making man-hours mean more since 1915. If you





AXELSON MANUFACTURING COMPANY
BIVESION OF U. S. INDUSTRIES, INC.

6160 S. BOYLE AVENUE, LOS ANGELES SB. CALIFORNIA . Dealers in Principal Tool Conters of the U. S.

12,979,660 LIGHTER CASES WITH



SWAGING DIES

Leading Fountain Pen Manu-lacturer cold swages 33 times more stainless steel parts with TALIDE dies.



HEADING AND EXTRUSION DIES

Cold-heading ¾" carriage bolts, TALIDE dies produced 1,500,000 pieces, steel dies only 50,000.



SHEET METAL DIES

137,000 hi-alloy steel Pressure Vessels drawn with TALIDE, against only 7,900 with steel dies previously used.



CURLING ROLLERS

TALIDE Curling Rolls last 65 times longer than steel rolls on beverage can forming

A leading producer of cigarette lighter cases was experiencing considerable trouble using steel dies. An excessive number of lighter cases were being scrapped due to tears and deformation. Die cost was running \$.028 per lighter. Operation involves drawing .020" thick carbon steel on A-3 Niagara presses, 45 strokes per minute.

Our die engineers were called in, and after installing specially designed Talide dies on customer's press line, rejects were eliminated, as well as time previously spent in buffing and polishing the cases after drawing. Subsequent plating expense was reduced 1/3 due to the smoother surface on the cases drawn.

The original 15 Talide dies placed in production have now drawn a total of 12,979,660 cases for an average life of 865,310 per die. Previous steel dies produced an average of 15,000 cases per die. Die life was therefore increased 58-1 after the installation of Talide dies.

Die cost has now been reduced to \$.0008 per lighter drawn, and customer estimates his saving for the past year, using Talide dies, has been at least \$25,000.



POWDERED METALLURGY DIES

Pill dies of TALIDE metal out-last steel dies 100 to 1 while reducing rejects 82%.



BLANKING AND FORMING DIES

70 times more paper discs blanked out with TALIDE— over hard alloy die.

IMPROVED QUALITY

Additional refinements and improvements in our process have added still longer lile to the wearing edges of Talide tools, dies and wear-resistant parts. The result is a carbide having a new, unique grain structure with harder and tougher properties than previous grades. Laboratory tests reveal our improved grades possess 25% greater strength and rigidity. Service lile per grind up to 50% longer than previous grades has been proven in grueling field tests.



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... on the fastest publishing schedule in history brings you 11 complete business and technical services, unique in their unsurpassed on-the-job usefulness. Here are just four of them:

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Got valuable profit-making new ideas every week . . in The Iron Age, for 100 years the greatest magazine of contributions

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OKI Enter my subscription at \$5 for 52 weeks which includes the special June issue "100 Years of Metalworking," and send me FREE of CHARGE the new HANDBOOK OF TERMS and the METAL FINISHING HANDBOOK.

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for people actively working in s. Price to all others is \$15 a year.

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The Handbook of Terms is an encyclopedie-compilation of hundreds and hundreds of terms that are used in the steel and nonferrous industries—and the first ever made available to people in metalworking. Whether you stamp metal or draw it . . . form, weld, machine or fabricate it this wonderful handbook, as a handy reference, will save you counties, tedieus lookup or checkup time. You'll refer to it a dozen times a day!

METAL FINISHING MANUAL

—one of the most popular of all Iron Age "specials." You will get a score of tables to answer questions on finishes, plating solutions, stripping, coating tests, corrosion resistence, etc., etc. All the new date on aluminum coatings . . and Powder metallurgy which is growing at an amazing rate. Don't miss this handbook! It has become a favorite for usefulness that is looked for each year . . and kept handy for quick answers to tough problems.

These two handbooks, reprinted from IRON AGE, are only a small sample of the mass of helpful data and ideas you can receive in a whole year (52 issues) of THE IRON AGE. And it's all available to you now for the small sum of less than 9¢ a week... a price that will be repaid many times over as you put these ideas to work saving time and money in your operations.

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FREE HANDBOOK
REPLY
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TODAY

Report To Management

Now You Know '54 Was Good

During the last several weeks final proof has come in that '54 was a really solid year for business. The evidence appears in the generally encouraging annual reports turned in by most companies.

Analysis of financial statements shows most of them reflecting a moderate drop in business activity as compared with '53 levels, but value of sales remained high, while net earnings and dividends registered increases. Big factors in making company financial statements much better than expected were the startling pickup in business strength in the last quarter and the death of the excess profits tax.

Survey by National City Bank of 2392 corporations indicates net income after taxes rose about 4 pct, from \$10.4 billion in '53 to \$10.8 billion in '54. Marked economic recovery in the last quarter had an important effect on the financial statements of most companies. Analysis of figures from 494 firms shows fourth quarter net income was 25 pct ahead of third quarter earnings and 20 pct ahead of income in final quarter '53. Outlook for '55 is that pre-tax income and income after taxes will be higher.

Home Building Boom Won't Fold

A lot of people are beginning to worry about how soon the home building boom will peter out. They point out that the rate of family formations is declining sharply (we were forming about 1 million new households each year—now the rate is down to less than 600,000 annually). They figure this spells trouble for the construction industry which in turn means less business for many other industries such as appliance makers, radio and TV producers, hardware manufacturers, automakers.

But the odds are heavily in favor of the home building boom's continuing—certainly through the rest of '55, probably longer than that. Here's why:

- (1) Despite the fact that in the latest 3-year period for which figures are available the number of new dwelling units put in place outnumbered new family formations by more than 1.1 million, there still remains a large backlog of housing demand. Homebuilding industry didn't really get moving until around 1950, and it still hasn't caught up with needs.
- (2) Easy financing, record number of children being born, and the fact that it is frequently cheaper taxwise to own than to rent, add strength to homebuilding outlook.
- (3) Increase in leisure time as a result of the shorter workweek has made home ownership more attractive to a lot of people.
- (4) A great many homes have been wiped out by changes in urban streets and freeways, and thousands of postwar makedo shelters have been scrapped.
- (5) The general exodus to the suburbs continues. In most cases this means moving from an apartment to a home.

It's Not Like the Twenties

It's also apparent the current building boom really isn't as "terrifying" as many people think. Though construction outlays are setting all-time records, much of this represents an increase in construction costs rather than an actual jump in construction volume. The current building surge is really moderate compared to the wild spree of the Twenties.

According to National Industrial Conference Board figures, construction expenditures in constant (1947-49) dollars averaged \$19.4 billion in 1950-54, compared with \$18.7 billion in 1925-29. And in the Twenties private construction expenditures amounted to about 13 pct of Gross National Product compared with only 6

pct in the 1950-54 period.

80

REP

INDUSTRIAL RRIFFS

Large Order . . . Greenville Steel Car Co. has received an order to build 100 70-ton covered hopper cars for the Western Maryland Railway Co., Baltimore.

New Acquisition . . . Effective March 1, National Lead Co. acquired the capital stock of Southern Screw Co., through the exchange of National Lead Co. stock for Southern Screw stock.

Attention . . . Duff-Norton Mfg. Co., Pittsburgh, has purchased the Coffing Hoist Co., Danville, Ill., and will operate the firm in the future as Coffing Hoist Division of Duff-Norton Co.

Company Formed . . . Amerigear-Zurn, Inc. has been formed in Erie, Pa., as the national sales organization for the flexible couplings and allied power transmission products made in that city by American Flexible Coupling Co.

Full Operation . . . Expansion and modernization at the Electric Auto-Lite Co.'s Sharonville, Ohio, plant has been completed and the plant is in full operation.

New Center . . . The first laboratory center in Colombia devoted to technological research will be established in Bogota, with technical assistance of Armour Research Foundation of Illinois Institute of Technology, Chicago.

Completed Agreement . . . Mathews Conveyor Co., Ellwood City, Pa., and the Foreign Trade Div., New York Hanseatic Corp., have completed arrangement whereby the latter will handle Mathews' line in all of South America and parts of Asia, Europe.

Turbine Turnover . . . Pratt & Whitney Aircraft, East Hartford, Conn., has shipped its one-thousandth J-57 jet turbine.

Foreign Fair . . . The German Industries Fair at Hanover, West Germany, is to be held from April 24 through May 3, this year. This Fair is devoted to the newest technical products, production processes and consumer goods.

Second Clinic . . . The annual Kenilworth Klinic has been announced for the week of May 9th, to be held in the company's plant at 750 Blvd., Kenilworth, N. J.

New Acquisition... The Thomas Laughlin Co., Portland, Me., was recently acquired by American Hoist & Derrick Co., St. Paul, Minn. The merger is the first step of an expansion program authorized by American Hoist stockholders.



FACSIMLE TRANSMISSION: Relays new orders fast, eliminates errors for U. S. Steel's Supply Div. at the Pittsburgh warehouse.

Appoints Representative . . . Arwood Investment Casting Corp., has appointed the Carl H. Schmidt Co., 2405 W. McNichols Rd., Detroit, their representative.

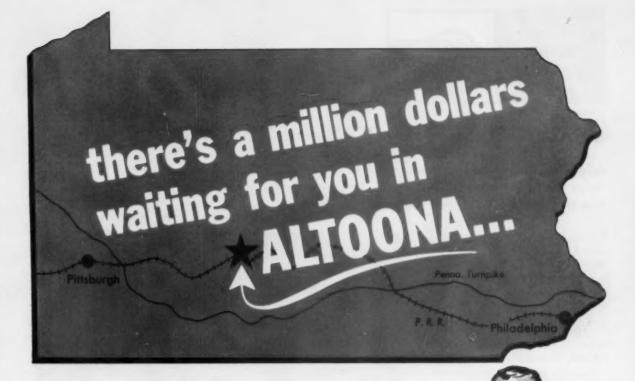
Purchased . . . North & Judd Mfg. Co., New Britain, Conn., has purchased the physical assets, inventories and patents of E. A. Bessom Corp. The Bessom Corp., has been manufacturing sheet metal self-locking nuts under the name Con-Torq nuts and wing nuts.

Crane Centennial . . . A century of achievement that parallels the advance of U. S. industry and living conditions over the past 100 years is being reviewed and celebrated by Crane Co., Chicago. The company has its beginning on July 4, 1855, when Richard Teller Crane, opened a one-man shop in Chicago.

Canadian Dealer . . . Mealpack Corp., Evanston, Ill., appointed Prowse Ltd., Montreal, as their franchised Canadian dealer. Prowse Ltd., division of Robert Mitchell Co., Ltd., is located at 350 Decarie Blvd., St. Laurent, Montreal.

Exclusive . . . The Refractories Div., Babcock & Wilcox Co. and Flightex Fabrics, Inc., have concluded a selling agreement whereby Flightex is granted the exclusive right to distribute B&W Kaowool to the aircraft industry.

New Associate . . . A. D. Wagner recently became associated with Ira S. Latimer Co., manufacturers' representative firm, 10600 Puritan Ave., Detroit. Mr. Wagner was formerly with the Hudson Motor Car Co.



to help you finance your new plant

Why put your money in bricks and mortar? Altoona Enterprises, Inc., an experienced community agency, has a non-profit million dollar fund to help you obtain desirable new factory space on a lease or sale basis. Take advantage. Get your new plant at non-profit rental or amortization!

Surplus of Skilled Labor-Altoona offers you 8,000 men and 3,000 women trained in mechanical skills and boasting an excellent record of efficiency and labor tranquillity. One metal firm, just located here, had 4,000 applications for 100 jobs!

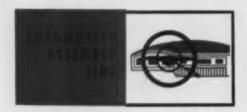
Mainline Transportation-Altoona is right on the PRR mainline. Excellent motor trucking facilities are available. The famous Pennsylvania Turnpike is just thirty miles away!



Near heart of steel-making industry . Excellent sites with all utilities, railroad sidings . Modern housing, no tenements . Vocational training in 11 skills . 66 millions in capital investment since 1943. · Home of satisfied industry including National Radiator, SKF, Butcher & Hart Mfg. Co., Sylvania and many other companies.

or phone Altona 3-8151 ALTOONA Chamber of Commerce in confidence.

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Chevrolet, Ford Both Claim '55 Title

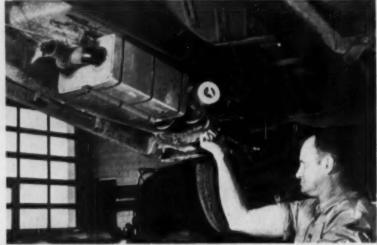
Ford claims foul in total registration figures . . . Refined count shows Chevrolet trailing . . . Neither can show clear victory in neck and neck race . . . Chrysler expands engineering—By W. G. Patton.

◆ THE OUTCOME of the hectic Ford-Chevrolet sales race for 1954—with each side claiming victory—can scarcely be called a surprise. Throughout the past year both Ford and Chevrolet have been making statements periodically that would substantiate their claims to sales supremacy during the past 12 months.

Based on deliveries of new cars to the customer, Ford has won the 1954 battle for the coveted top position. To justify its claims, Ford introduced some interesting mathematical computations that Chevrolet followers have challenged, although not too vigorously.

Polk Revises . . . According to Ford spokesmen, in years past R. L. Polk & Co., official registration tabulator, has followed a policy of withholding excessive registrations in dealers and manufacturers names from the December total. These registrations were then counted during some subsequent month of the following year, Ford insists.

Polk has remained strictly silent on its current registration practices. However, Ford claims



NEW ANTI-SMOG muffler being tested by Air Pollution Foundation is shown attached to underside of car for road tests. Known as catalytic type.

that Polk discontinued the practice of withholding dealer and manufacturers registrations during December of this year. Therefore, Ford requested and obtained from R. L. Polk the dealer and manufacturers listings for the month of December. These were deducted by Ford statisticians from the 1954 totals. The Ford explanation is that the "refined

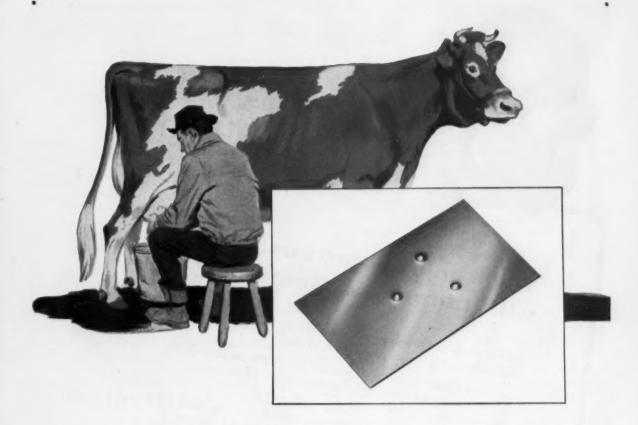
registrations" more nearly reflect sales of cars to the customer.

After issuing a statement again claiming sales leadership for 1954 Chevrolet has been silent. On the basis of total registrations compiled by Polk, Chevrolet can claim victory in 1954 by a margin of 17,013.

Close All the Way . . . Perhaps the most significant figure in the Ford computation is the number of registrations in dealers and manufacturers names in December 1954. The comparative figures are 14,838 for Ford and 56,802 for Chevrolet. With these sales eliminated. Ford can claim a sales victory by a margin of 24,951. With each company currently producing about 7,000 cars per day, the margin of victory, based on "refined registrations," is about 31/2 days production. Turn Page

How Ford Won "Refined" Victory

		Ford	Chevrolet
Less:	Raw, "unrefined" registration figures Registrations in dealers and manu- facturers names, Dec., 1954	1,400,440 14,838	1,417,453 56,802
		1,385,602	1,360,651
Plus:	Registrations in dealers and manufacturers names, Dec., 1953	1,742	1,436
	Net registration	1,387,344	1,362,087



The bumper mount and the 3-legged stool

A case history of interest to any manufacturer who uses flat-rolled steel. A little piece of steel like that shown above serves as an automobile bumper mount. Originally, this mount was to be projection-welded to the bumper at each of four points. But during the welding process, at the supplying manufacturer's plant, one point of the mount either refused to take the weld, or it broke easily under strain.

Time was running out. Production lagged and costs skyrocketed. And then a Great Lakes Steel Technical Service Representative was called in. He discovered that, regardless of how flat the rectangular mounting might be, it was virtually impossible to get a strong projection weld at all four corners. But when he eliminated one weld, the plate snuggled into the bumper and made perfect contact on three points—just like a three-legged stool! Three welds were actually stronger than four.

Solving problems is a tradition at Great Lakes Steel. As specialists in flat-rolled products, Great Lakes has had to come up with the right answers to problems in many fields. It will pay you to take advantage of this reservoir of experience next time you have a problem that concerns flat-rolled steel.

GREAT LAKES STEEL CORPORATION
Exerse, Detreit 29, Mich. A Unit of





SALES OFFICES IN BOSTON, CHICAGO, CINCINNATI, CLEVELAND, HOUSTON, INDIANAPOLIS, LANSING, LOS ANGELES, NEW YORK, PHILADELPHIA. PITTSBURGH. ROCHESTER, ST. LOUIS, SAN FRANCISCO AND TORONTO



One buyer tells another...

"You'll enjoy doing business with Lamson & Sessions"

Did you ever stop to wonder why you patronize a particular store, restaurant or barber shop in preference to all others?

Perhaps it is habit; or maybe convenience. But chances are the main reason is because you like the people who serve you. It's a pleasure to do

Just out of curiosity we asked several of our customers of long standbusiness with them. ing the reasons behind their year after year loyalty to Lamson & Sessions.

Of course, we received a variety of answers, but the reason that cropped up most frequently was: "Because we enjoy doing business with you."

Naturally that made us feel pretty good. Our people do try to give every customer an extra measure of attention over and above the requirements of common courtesy.

All else being equal, perhaps that's why year after year, so many companies prefer to call on Lamson & Sessions for all their bolt and nut

You, too, can enjoy this kind of business relationship.



YOU GET MORE WHEN YOU BUY FROM

CLEVELAND AND KENT, OHIO . BIRMINGHAM . CHICAGO

Automotive Production

(U. S.	and Canada	Combined)
WEEK ENDING	CARS	TRUCKS
Mar. 12, 1955	180,972	22,177
Mar. 5, 1955	176,180	16,712
Mar. 13, 1954	119,307	24,171
Mar. 6, 1954	116,785	22,478

*Estimated. Source: Ward's Reports

Looking at the 1954 passenger car race by months, during the first 11 months of 1954 (which eliminates the contested registrations during December), Ford outsold Chevrolet 5 times whereas Chevrolet sold more passenger cars domestically than Ford in 6 different months. Going into December, Ford passenger car registrations exceeded the Chevrolet total by 7,791 units.

Anyway you look at it, this was a photofinish. The real issue of sales supremacy between Ford and Chevrolet will have to be settled during 1955.

Engineering:

Styling, design gain in Chrysler expansion program.

Styling and design will get the bulk of attention in the expansion program of Chrysler's engineering facilities announced last week. The new program, scheduled for completion in March 1956, will add nearly a third to the company's engineering facilities. Unofficial estimates place the cost of the program in the neighborhood of \$10 million.

The need for increased engineering space has been experienced by all of the motor car producers. GM's vast Technical Center is now nearing completion. Ford is also expanding its engineering activities. Chrysler officials estimate that nearly 800 engineers, technicians and supporting personnel will be added to its payrolls during the next 18 months.

Thousands of Projects . . .

Chrysler engineering activities in Highland Park today occupy more than 15 acres. Major construction items in this new program include (1) a new 3-story building of 182,112 sq ft to be devoted principally to body design and styling, (2) a substantial addition to the present 3-story engineering building and (3) a major addition to the dynamometer laboratories.

Scope of the engineering activities of major automobile producers these days is a little breathtaking. Chrysler officials estimate that at all times the company has 2200 active research projects in various stages of completion. Annual blue print requirements for the Chrysler Engineering Dept. alone totals more than 20 million sq ft.

Automation:

Ford official defines word, cites historical precedent.

Probably the shortest and best definition yet devised to describe automation was coined by R. H. Sullivan, vice president and group executive, Ford Motor Co.

Speaking in New Orleans recently, Sullivan observed that what we call automation is really nothing more than "improved machinery and more productive tools AUTOMOTIVE NEWS

to do the work that man formerly had to sweat to do."

All Do It . . . Sullivan pointed out that automation has appeared under many other names in other areas of our economy. For example, as far back as 1784 an ingenious Pennsylvanian built an automated flour mill with a system of conveyors run by water power that picked up the grain and carried the entire milling process through to the finished flour without any human labor.

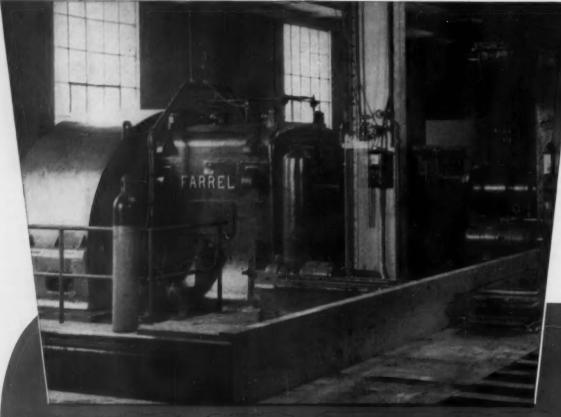
Similarly, he argued, the automatic dialing system of the telephone companies can be considered a form of automation. Big oil refineries long ago perfected a number of automatic refining techniques, he said.

The big contribution of modern industrial automation, Sullivan pointed out, is linking machines together by means of transfer equipment. Thus, heavy parts and materials are being handled on a continuous automatic flow basis.

THE BULL OF THE WOODS

By J. R. Williams





GEARS AND BEARINGS LAST LONGER . . .

WHEN YOU USE Texaco Meropa Lubricant, with its extraordinary EP characteristics, reduction gears and bearings will be effectively lubricated against wear, effectively protected against corrosion. You'll get smoother operation, longer gear and bearing life, lower maintenance costs.

In the circulating system for your roll necks, turbine-quality Texaco Regal Oil, with its outstanding resistance to oxidation and

sludging, gives effective protection to oil film bearings, extends the life of your back-up rolls.

A Texaco Lubrication Engineer will gladly explain how effective lubrication - Texaco can reduce costs throughout your mill. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N.Y.



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TUNE IN: TEXACO STAR THEATER starring DONALD O'CONNOR or JIMMY DURANTE, on TV Sat. nights. METROPOLITAN OPERA radio broadcasts Sat. afternoons



Aluminum Capacity Up For Fresh Look

Tight supply is beginning to pinch consumers doing non-defense work . . . Price rise feared as strike threat puts added pressure on market . . . New expansion program may be necessary—By G. H. Baker.

◆ GOVERNMENT is getting ready to take a fresh look at the question of aluminum-producing capacity. As a result, the Office of Defense Mobilization may kick off a fresh round of expanding basic production capacity in this country.

Only 8 months ago, there was a surplus of aluminum for both military and civilian needs. In August, 1954, the ODM announced it was discontinuing the so-called "third round" of expansion because supplies were adequate to meet needs.

Total domestic primary capacity was estimated by ODM at 1,540,-000 tons annually. This figure was considered "ample" by the planners for a long time to come, but now there's mounting evidence that it is somewhere short of total requirements.

Fill Defense Needs... Prospect of a price rise is now a distinct threat to aluminum consumers. This is true not only because of the pinch on supplies, but also because the possibility of a strike late this spring will trim the lean supplies still further.

ODM insists that no defense contractor or subcontractor has any trouble getting all the aluminum he needs to fill his contracts, but it admits that it has been receiving complaints from fabricators of civilian-type products (aluminum screens, and the like) who are feeling the pinch of the tight supply situation.

May Close Meetings . . . Trade association men may be barred from all government - industry

meetings in the future, if the Justice Dept. has its way.

At the present time, officials of trade and industry associations are permitted to serve on joint government-industry committees and to offer advice on matters that may affect an entire industry—not just one company. Industry pricing practices are a prime example.

Is this—these meetings—where collusion starts? Justice Dept. thinks these government-industry groups may serve unwittingly to incubate some "horizontal" industry prices and programs that may be afoul of the antitrust laws.

See Monopoly Threats... Commerce Dept., on the other hand, thinks not. Commerce Secretary Sinclair Weeks sees nothing wrong with the existing arrangement. He points to safeguards employed (accurate minutes must be kept, and are available for inspection) and to the valuable advice the association men can contribute to these joint sessions. Proposed ouster deprives the government needlessly of valuable counsel, it is argued.

Government lawyers think any

advantages are outweighed by the danger that the seeds of monopoly may possibly be fermented in these sessions. They take the position that participation in industry meetings at least suggests collusion among the members of a given industry. They're in favor of locking the doors to all association representatives.

Warns On GAW . . . A new look by a Harvard economist at some likely results of guaranteed wages is top-priority required reading this week for the Eisenhower Administration's business experts.

Prof. Seymour E. Harris (Harvard), writing in the authoritative Labor Dept. mouthpiece, "Monthly Labor Review," warns bluntly that widespread adoption of GAW plans points to curtailed returns on investment.

And, because of shriveled returns, new investment will be discouraged in the industries subject to GAW. This situation then will result in pressure for either (1) cutting wages or (2) raising prices, as Prof. Harris sees it. Marginal producers would be forced to close their doors, thereby adding to unemployment.

See Many Hurt . . . Some industries will be able to withstand the jolts of a GAW better than others, it is reasoned. Prof. Harris predicts that a GAW could be supported without much blood-letting in metals, machinery, instruments, chemicals, oil, and rubber.

But others, like textiles, apparel, and shoes, would have a hard struggle to support a wage guarantee, he argues. In fact, the



10 Station Automatic In-Line



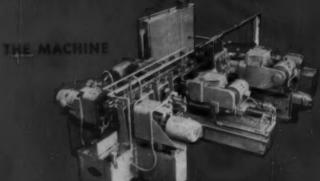
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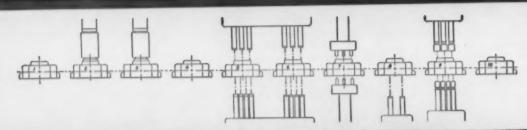
MACHINE

Percornes Multiple Coordings on Tracter Housing









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STATION NO. 2

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UNIT NO. 1 COMB. FIN. BORE 5.180 & 3.264 & 2.876 DIAS COMB. FIN. BORE 4.440 THRU BOTH WALLS

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Whatever Your Specific Jab Problem, Consult

THE OPERATIONS

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UNIT NO. 3 31/64 DRILL 8 HOLES 21/32 DRILL 1 HOLE "U" DRILL 6 HOLES 23/32 DRILL 1 HOLE

STATION NO. 6

UNIT NO. 2 1/2 CHAMFER 5 HOLES 1/4 CHAMFER 6 HOLES

UNIT NO. 3 % CHAMFER 7 HOLES 13/16 CHAMFER 1 HOLE ½ CHAMFER 6 HOLES 23/32 DRILL 1 HOLE COMB. COUNTERBORE .796 & CHAMFER 1 HOLE

STATION NO. 7

STATION NO. 8

UNIT NO. 4. .6910 REAM 1 HOLE .8157 COUNTERBORE 1 HOLE

STATION NO. 9

UNIT NO. 5 7/16-14 N.C. TAP 5 HOLES 9/16-12 N.C. TAP 6 HOLES

UNIT NO. 6 7/16-14 N.C. TAP 6 HOLES 9/16-12 N.C. TAP 7 HOLES ½-14 N.P.T. TAP 2 HOLES

STATION NO. 10

BAKER BROTHERS, INC.

NC., TOLEDO, OHIO

assessing of penalties for cutting the numbers of workers would accelerate the decline in these industries.

Some angles of GAW are open invitations to recession and depression, he points out. For example: An employer, confronted with supporting idle workers when demand is declining, will cut outlays in all possible directions. Thus a chain reaction is set off, causing lessened demand among his suppliers and resulting unemployment in distant areas.

Atoms Going Abroad

More than 60 U. S. firms and institutions are preparing to tell the free world how to put atomic energy to work in peaceful pursuits. Their plans will be presented in a series of technical exhibits at Geneva, Switzerland, next Aug. 8-20 in the multi-nation conference on peaceful uses of atomic energy.

U. S. Atomic Energy Commission is in charge of all U. S. presentations at the conference. Dr. George L. Weil AEC consultant, is directing assembly of material. The conference may be attended by as many as 84 nations, including 10 from the Communist bloc.

On the agenda will be presentations on reactor technology, nuclear power, radiation protection, industrial uses of isotopes, and applications of atomic energy to biology, medicine, and agriculture.

Tariffs:

Tell Congress U. S. mining is hard hit by imports.

Imports of foreign lead, zinc, and residual fuel oil are responsible for the depressed state of the mining industry and the unemployment which has resulted, industry spokesmen are telling Congress.

Otto Herres, chairman of the National Lead and Zinc Committee, told a special Senate Labor subcommittee that increasing imports have caused unemployment in that industry. "Stockpiling will not cure an excess supply of foreign lead and zinc flowing into this country," he said.

Walter R. Thurmond, secretary of the Southern Coal Producers' Assn. said oil imports displaced about 48 million tons of domestic coal production last year.

He termed "useless" the Cabinet Committee recommendations that voluntary oil import quotas be established and freight rates reduced, and asserted that coal could compete with domestic fuel oil, but not with oil produced by "cheap foreign labor."

The Senate Labor Committee also is hearing reports of unemployment in textiles, glass clothespins, and pottery. It is expected to recommend some sort of federal aid soon.

Radio:

Seek new bands and wider use in steel plant operations.

Heavy industry needs in the twoway radio field are up again for consideration by the Federal Communications Comm. Jeremiah Courtney, representing the National Assn. of Manufacturers and the Committee on Manufacturers Radio Use, leads the fight for an opening up of industrial broadcasting.

Steel companies operate their radios in the 152-162 megacycle band, which has five 60-cycle frequencies. Congestion is very thick, as these frequencies are shared by many other users.

Mr. Courtney asked that steel producers be given equitable treatment with such groups as petroleum companies and railroads. The latter are granted microwave permits by FCC.



WASHINGTON NEWS

In addition, he proposes elimination of the ban on dispatcher communication with company vehicles when the latter leave plant yards in the 33 standard metropolitan areas with populations of more than 500,000.

Continuous contact with vehicles is needed if efficient use is to be made of radio nets, Mr. Courtney maintains. His clients could limit their out-of-yard communications to 10 pct of total transmission—but they need that 10 pct.

May OK Renegotiation

Renegotiation of all government contracts shapes up as a likely prospect for congressional approval. Under a new proposal submitted to Congress recently by President Eisenhower, renegotiation is to be made retroactive from Jan. 1, 1955—the date the old renegotiation law expired—and extending through Dec. 31, 1956.

In a special message to Congress recommending the compulsory renegotiation of all government contracts, Mr. Eisenhower said the complex nature of modern military equipment made it "impossible" to determine accurate prices. Limited sources of supply, he stated, rule out the price benefits that normally result in competition.

Open Credit Lines

Exporter credit lines totaling \$2.6 million are opened by Export-Import Bank of Washington for three firms making foreign sales of heavy industrial equipment.

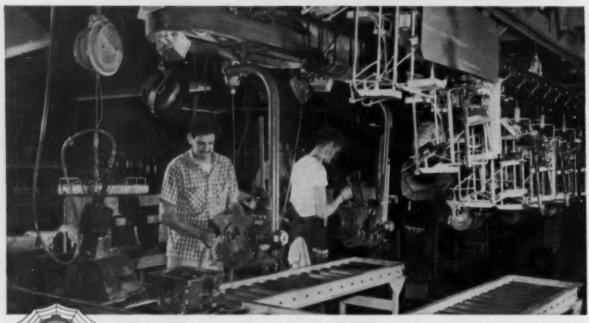
The Babcock & Wilcox Co., New York, gets the largest amount, \$2.2 million, to assist in export sales of electric power and industrial steam boilers and auxiliary items.

Kenworth Motor Truck Corp., Seattle, has a credit line of \$300,-000 for its sales of heavy-heavy duty motor trucks and trailers.

A third credit line, amounting to \$100,000, goes to Intercontinental Mfg. Co., Inc., Garland, Tex., for sales of farm tractors and attachments and farm implements.

JERVIS B. WEBB

CONVEYOR ENGINEERING, MANUFACTURE, INSTALLATION and AUTOMATION



POWER and FREE CONVEYORS PROVIDE Flexibility for Assembly, Testing, Live Storage

This Webb "Power and Free" conveyor system, in the automatic transmission plant of one of the "Big Three" automobile manufacturers, is a prime example of accomplishment in efficiency, reduction of production costs and elimination of manual materials handling.

Starting in the sub-assembly area, a Webb overhead trolley conveyor carries parts to the final assembly department (shown above) where two "Power and Free" conveyors take over and carry the transmissions through every assembly operation. After assembly is completed, another "Power and Free" conveyor provides live overhead storage for the transmissions until they can be taken by conveyor to the test stand area.

In a similar manner, all fifteen "Power and Free" conveyors,

located throughout the plant, are synchronized into an automatic system that is thousands of feet long. From the receiving of transmission parts, through final assembly, several live storage areas, testing, and delivery to shipping, the transmissions never leave the Webb "Power and Free" Conveyors.

With Webb "Power and Free" conveyor systems, the power is transmitted from pushers on the power trolleys to the free trolleys which carry the load. When power is not required at specified storage or stationary assembly locations, the power line is raised to disengage the free trolleys. An ever increasing number of manufacturers are finding this system an ideal solution to their production requirements for a conveyor that provides a combination of automatic handling, stationary assembly facilities and live overhead storage.

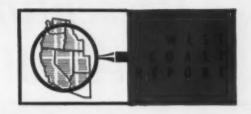
Write to us on your company letterhead and we will be happy to place your name on the Webb mailing list to receive factual technical information on conveyor installations, case history reports; and new product literature.

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New Aircraft Orders Bolster West

Aircraft industry now No. 1 metalworking employer in West . . .

New orders prompt expansion and further research . . . Boeing may be first in nation to produce passenger jetliner—By R. R. Kay.

 WEST COAST metalworking companies serving the aircraft industry here can breathe easier.
 Production stretchouts won't be as frightening to them as six months ago.

Major airframe builders have big new orders, are expanding facilities, and announce, almost daily, important research and manufacturing developments. This spells out many years of steady business for over 10,000 western subcontractors and suppliers whose prosperity is closely tied to aircraft manufacture. The aircraft industry, already the West's No. 1 metalworking employer, is rooting itself even deeper into the economy.

First Jetliner... U. S. Air Force contracts for \$460 million are going to Boeing Airplane Co., Seattle, for KC-135 jet aerial tankers. The orders call for Boeing to subcontract as much of the work as possible. This is on top of contracts for \$260 million the company already has for this plane.

Boeing is now in an excellent spot to become the first U. S. company to produce a passenger jet-liner. Production facilities and know-how it's getting from the tanker program will give the company a big jump on the field. There's one rub, however. The USAF may keep Boeing so busy with tanker production that only a small number of passenger models may get squeezed through.

This leaves the door open for Douglas Aircraft Co., Inc., Santa Monica, Calif., to get in the act with its DC-8 jetliner. Meanwhile, Lockheed Aircraft Corp., Burbank, Calif., received a USAF design and development engineering contract for an advanced jet tanker.

Companies with metalworking services and supplies for the aircraft industry should keep on top of these latest developments. There's lots of business to be had.

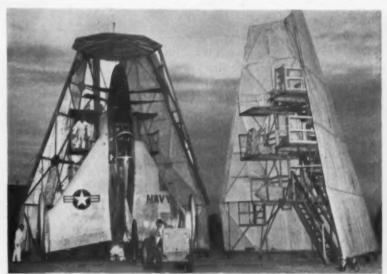
New Orders ... Douglas has new orders for commercial airlines for sixteen DC-7C and three DC-6B transports. Estimated cost of the planes is \$52 million. The company will spend \$1 million to revise and expand its DC-7C production facilities at Santa Monica.

Stepped-up production is planned for next month on the new final assembly line for USAF C-131B's at Convair's San Diego Div. of General Dynamics Corp. Convair hopes to raise production from three to five planes a month and to keep that level through this year and into next.

Lockheed bought the 370,000 sq ft Willys automobile plant at Maywood (Los Angeles area). Burbank facilities can't handle the production loads scheduled for 1955 and 1956 . . . Lockheed Aircraft Service, Inc., got a \$6.1 million contract for modification of military planes.

Ryan Aeronautical Co., San Diego, landed \$4 million in new orders for afterburners and jet engine components. Contracts are from General Electric Co., Ford Motor Co., Pratt & Whitney Aircraft, and Wright Aeronautical Div. of Curtiss-Wright Corp.

Northrop Aircraft, Inc., Hawthorne, Calif., has \$2.5 million in new contracts from McDonnell Aircraft Corp., St. Louis. The work calls for engineering design.



TEPEE FOR POGO—a new look in aircraft hangers. A tractor maneuvers the Convair XFY-1 "Pogo" into its new type folding hangar on wheels.



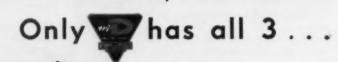
adaptable to almost all horizontal and some vertical milling machines ...regardless of make

MILWAUKEE

The new TRI-D Milling Head is the latest addition to Kearney & Trecker's outstanding Rotary Head milling family. TRI-D is designed for quick, easy mounting on practically all horizontal and some vertical milling machines.

The TRI-D Milling Head can produce almost any geometric shape in metal employing straight lines, radii or angles — all in a single set-up. Power is transmitted to the spindle through a heavy-duty flexible shaft driven by the machine spindle or a separate variable speed motor unit.

TRI-D's matchless technical perfection brings to metal cutting an insured investment equalled by no other single element of production. Find out how you can increase production and cut milling costs with this new milling head. Your Kearney & Trecker representative will be pleased to give you all the details. Contact him today, or write Kearney & Trecker Corporation, Milwaukee 14, Wisconsin.



1. LATERAL ADJUSTMENT of the cross-slide permits off-setting the spindle up to 2½". A large dial, graduated in thousandths, is mounted on the cross-slide screw. Precision-ground screw assures the ultimate in accuracy and long life. A friction lock secures cross-slide position.

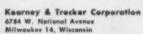
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MACHINE TOOLS

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- 2. ROTARY MOVEMENT of the head through a complete circle, or any specific part, is easily accomplished by turning handwheel in either direction. Combined with lateral adjustment of the cross-slide, this rotary movement permits milling of circles up to 5" in diameter.
- 3. ANGULAR ADJUSTMENT of cutter, an exclusive feature, is the swivel block which permits positioning of the cutter at any angle in the vertical plane, up to 15°, either side of center. Easy-to-read graduations make setting to a precise angle a very simple operation.



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CORPORATION



Long Machine Life Can Be Oversold

Machines should be replaced before they fall apart . . . Production rates and costs must be weighed against new machine performance . . . Proper selling will cut unprofitable operations—By E. J. Egan, Jr.

◆ HOW to determine the service life of a machine tool is an interesting question. As the saying goes, "It all depends." Bulletin F of the Internal Revenue Service gives one answer. The gnarled old-timer in the machine shop has another: he pats the old lathe, or miller or boring mill he's worked on since time began and fondly says, "Why this baby's good for another 40 years for sure."

Builders, too, used to emphasize service life by proudly pointing out that machine tools they sold 40 and 50 years ago were still turning out a day's work. It's quite true. Some ancient pieces of equipment are running day in and day out. And a few builders still shout about it, but not very many. The modern machine tool salesman plays this tune with a very soft pedal.

Latest sales technique is to answer the \$64 question another way: a machine tool's service life should end the minute it can be replaced by something that will do the job better, faster and cheaper.

Can't Last Forever . . . One Midwest builder thoughtfully summed up this new merchandising philosophy during a recent IRON AGE interview. He agreed that most machine tools would undoubtedly function with reliability and precision for many years. He said this is because they're master tools which must be built to the highest quality standards. With proper care, there's no telling how long they'll last, he said.

But he thought that builders who preach long equipment life do themselves and their customers a great disservice. He said a great many customers take such statements to mean that once they've bought a machine tool, they're free of any obligation to even look at a new model for another 20 or 30 years.

Urge Positive View . . . He maintained that pride in one's product was indeed a fine thing; the salesman would be sunk unless he had plenty of pride and the ability to make it impress a prospect. But he said that pride in the old equipment is a negative thing; pride in today's and tomorrow's tools is the only way to lick obsolescence.

Considerable emphasis on the positive approach to combat creeping machine tool obsolescence was apparent at the first ASTE Western Industrial Exposition in Los Angeles this week. D. E. Hawkinson, vice-president of Greenlee Bros. & Co., told a group

of engineers and executives that "Never before have as efficient tools been offered to production engineers as today."

Lists Tool Classes . . . Mr. Hawkinson proclaimed American machine tools to be the world's best investment. He grouped them in four basic categories from which industry could choose:

 Standard tool room machinery such as the familiar drill press designed to do one type of operation on a variety of parts.

(2) Standard machine tools designed for high production.

(3) Basic machines from the first two groups which are adapted to handle either extremely high production or difficult operations or a combination of operations.

(4) Special machine tools designed to perform specific operations on one or more production parts, including transfer machines which do as many as 30 simultaneous operations 125 times or more per minute.

Europe Uses More . . . Exposition visitors also learned from University of Missouri's Dr. E. K. Henriksen that clamped-on chip control breakers are more widely used in Europe than in America. Dr. Henriksen stressed that these devices are safe, have long service life and help reduce wear on critical and expensive tools.

Audience at another ASTE technical session heard that "most gears could be reduced in size if manufacturing could produce them more accurately." This theory was put forth by Fred Bohle, manager of machine development for Illinois Tool Works.





Arc welding of the Filter/Separator.



It has been found that minute traces of water in aviation gasoline can stop the engine when flying in low temperatures, as at high altitudes, or over the pole. The amount of water involved is so small that it would not bother an automobile carburetor. To remove it for safe flying requires a special Filter/Separator. All metal parts going into this filter were specified to be 90-10 Cupro-Nickel. One of the contractors for the U. S. Navy is the Bendix-Skinner Division of the Bendix Aviation Corporation, Royal Oak, Mich. When Bendix-Skinner obtained the order, it called in Revere's Technical Advisory Service. A complete study was made of the blueprints and specifications, in order to set up the most economical purchasing schedules. When production began, personnel from the Welding Section of the Research and Development Laboratory maintained by Revere in Rome, N. Y., went to the Bendix-Skinner plant to share their know-how with the welders, so as to be sure the welds would pass strict inspection, yet be made at competitive costs.

competitive costs.

Cupro-Nickel, 90-10, is highly resistant to corrosion and other forms of attack. Because it contains only 10% nickel, it is more economical than the richer alloys, yet in many applications just as satisfactory. We suggest you look into it.

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The Iron Age

Benjamin B. Bachman

One of the few living founders of SAE, he has held every big
post there and has played an important part in bringing the Society to its
present honored position in American industry.

"Best friend the SAE will ever have." These words introduced Benjamin B. Bachman at a Society of Automotive Engineers dinner in 1953. They take in a lot of territory but the record backs them up.

Vice president in charge of engineering at the Autocar Co., Ardmore, Pa., Bach has done an outstanding job for that company for over 50 years. But his influence has not been confined to any one company.

His work with SAE places him in a special class as an industry pioneer. He helped start the organization in 1910 and he has served in almost every important SAE post since that time. A straight thinker and a popular leader, he has played a big part in bringing SAE to its unique position in American industry.

Bach was born in Philadelphia quite a few years before the horseless carriage took over. His formal schooling ended with high school but this was barely the beginning of his education. Training himself, he went on to become one of the top U. S. truck engineers.

He joined Autocar engineering force in 1905, after working with different Philadelphia manufacturing concerns. He became chief engineer in 1914 and was elected vice president in charge of engineering in 1929.

His association with SAE dates back to the days when the society had \$4.69 in the till and numbered 583 members. He was named president of the organization in 1922. He was chairman of the SAE War Activity Council. He became treasurer of the society in 1944 and has held that post continuously to the present.

Numerous technical papers on automotive subjects have made Bach one of the most highly respected engineers in the field. His personality and integrity have won him a host of friends throughout industry.

Bach is still going strong despite his active role in a half-century of important history. He plays bridge and golf; is a heavy reader; and vacations with his wife in Skytop, Pa. A friendly, courteous approach marks all his activities, business or social.



Luxurious 1955 Packard 400 Hardtop - product of Studebaker-Packard Corporation, Detroit, Michigan.

Packard parts begin life with a Wyandotte bath

In the production of the great new Packards for 1955, Wyandotte products are used in vital cleaning processes: Altrex* for aluminum soak cleaning; Industrial D in spray washers, to remove fabricating compounds and other soils from steel parts; R-2 as an in-process rust inhibitor in spray rinses.

In fact, Packard has been using Wyandotte products for more than ten years—for more effective cleaning at lower use-cost. For in the manufacture of fine motorcars, quality is the foremost requirement—and cost is an important factor as well.

How about your business? Wyandotte offers the most complete line of metal cleaners in the industry: for burnishing and deburring; vat, steam-gun, washing-machine and emulsion cleaning; electrocleaning; rust removal; paint stripping; spray booths.

For technical assistance and data, call in your Wyandotte service representative, today. Or write us, c/o Dept. 2315, detailing your needs, along with specifications and requirements. Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California. Offices in principal cities.

*REG. U.S. PAT. OFF.

Call on Wyandotte to improve quality, cut costs



Packard uses Wyandotte cleaners in small soak tanks, to rid parts of cutting oil and soil; and in spray washes and spray rinses.



Wyandotte scientists can set up or duplicate any spray-washing cycle on this sixstage washer, to help solve your problems,



arch davalaned area

Research-developed products for metal cleaning

The Iron Age INTRODUCES

L. T. Willison, promoted to assistant general manager of sales, Jones & Laughlin Steel Corp., Pittsburgh. Howard A. Knox is promoted to manager, sheet and strip products, and Harry R. Johnson joins the company as manager of tin mill products.

Wayne T. Brooks, named director of labor relations, Wheeling Steel Corp., Wheeling, W. Va. R. S. Carnahan, named personnel director, and E. A. Rutledge, named assistant personnel director.

Clarence C. Walker, succeeds Ray W. Turnbull as commercial vice-president, San Francisco territory, General Electric Co.

Jim Lekander and Thomas Kohler, appointed salesmen and service representatives, Detroit and southern area, Wagner Brothers, Inc.

Albert Holmes, Jr., named regional manager, Detroit, Virginia Metal Products, Inc.

John A. Ackley, appointed secretary - treasurer, Pyrofax Gas Corp., a unit of Union Carbide & Carbon Corp., New York. Mr. Ackley was also appointed secretary-treasurer, Pyrofax Gas Ltd., a Canadian subsidiary.

Fred L. Amter, named sales manager, Federal Carbide & Cutter Co., Inc., Rochelle Park, N. J.

Louis G. Helmick, Jr., elected vice-president, manufacturing, Joy Mfg. Co., Pittsburgh.

John J. Selway, appointed general manager, Chester Blast Furnace, Inc.

K. J. Pedersen, appointed central area sales manager, Acme Steel Products Div., Acme Steel Co., Chicago. G. R. Easley, appointed southern area sales manager, and C. C. Turner, eastern area sales manager.

Thomas C. Mortimer, named southern regional sales manager, Delta Power Tool Div., Rockwell Mfg. Co., Atlanta. Samuel W. Brown succeeds Mr. Mortimer as wood-working products manager.

H. J. Endean, named assistant product manager for closures, Aluminum Co. of America, Pittsburgh.

Clifford H. Keen, appointed assistant general sales manager, Hubbard & Co., Pittsburgh.

Clarence I. Buchanan, named store manager, Oil Well Supply Div., U. S. Steel Corp., Carmi, Ill.

Louis Blendermann, becomes director of engineering, Plumbing Div., J. A. Zurn Mfg. Co., Erie, Pa.

C. Thorpe Thompson, named executive vice-president and general sales manager, Cleveland Instrument Co.

Robert G. Hess, named general manager, The Washburn Co., Worcester, Mass., and its subsidiaries. Albert L. Zuck, named manager, Worcester Div.



RUSSELL B. BARNETT, elected president, Peter A. Frasse & Co., Inc., New York.



D. D. GREENSHIELDS, elected president of Pittsburgh Screw & Bolt Corp.



JAMES W. KINNEAR, JR., appointed assistant vice-president-engineering, U. S. Steel Corp.



A. A. PORTER, named vice-president, charge of erecting, American Bridge Div., U. S. Steel Corp.



I. B. Taylor, Jr., elected assistant treasurer, American Welding & Mfg. Co., Warren, Ohio. John F. Tyler, elected assistant secretary.

Leslie L. Andrus, elected to the board of directors, American Wheelabrator & Equipment Corp., Mishawaka, Ind. Others elected: Harold M. Miller and Ray P. Whitman.

S. Allen Oviatt, appointed sales engineer, special materials, Universal-Cyclops Steel Corp., Bridgeville, Pa.

Robert W. Stoddard, named president, Wyman-Gordon Co., Worcester, Mass. Harry G. Stoddard became chairman of the board; George F. Fuller, made honorary chairman of the board. Sacket R. Duryee, named vice-president.

Edward A. G. Porter, named a director of Superior Tube Co., Norristown, Pa.

Kenneth C. Lutz, appointed New England district manager, Luria Engineering Co., Boston.

Walter R. Stendahl, appointed district traffic manager, New York, Crucible Steel Co. of America, and Daniel G. Donovan, appointed district traffic manager, Pittsburgh

Thomas Hollingsworth, appointed assistant manager, agency and construction sales department, apparatus division, Westinghouse Electric Corp., Pittsburgh.

John S. Roller, named Detroit district sales manager, Firth Sterling, Inc.

Thomas W. Astle, promoted to sales engineer, Reliance Electric & Engineering Co., Buffalo.

Warwick J. Hayes, Jr., named vice - president, sales, Industrial Brownhoist Corp. E.W.Taylor, Jr., named vice-president-engineering.



A. J. McLAREN, named vice-president-sales, Cross Co., Detroit.



KURT O. TECH, named vice-president-engineering, Cross Co., Detroit.



CHARLES A. TAYLOR, appointed vice-president, Copperweld Steel Co., Pittsburgh,

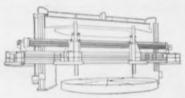


WEBSTER E. BARTH, appointed sales manager, Eastern Brass & Copper Co., New York.

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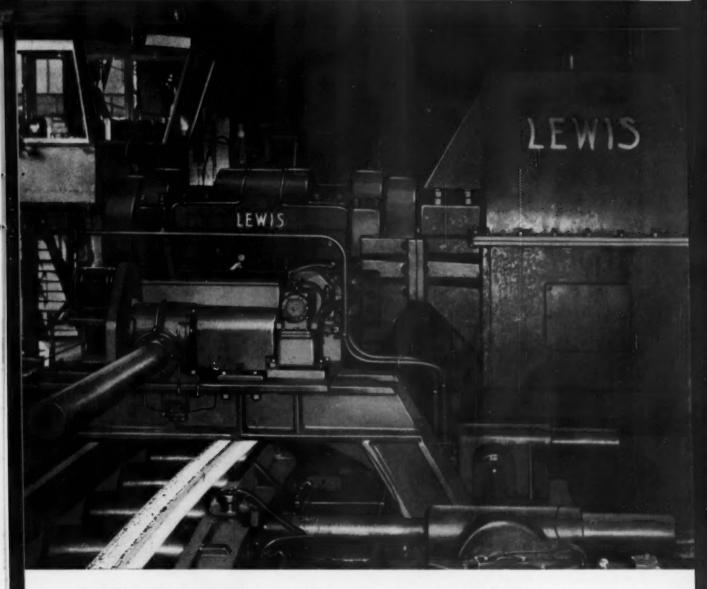
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In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

Louis C. Billings, named commercial division field engineer, Lamson Corp., Syracuse, N. Y.

Eugene R. Hoff, promoted to New York district sales manager, Laclede-Christy Co., division of H. K. Porter Co., Inc.

Robert C. Stranahan, promoted to manager, merchandise distribution, Metal Products Div., Goodyear Tire & Rubber Co., Akron, Ohio.

Ronald F. St. Martin, joined W. C. Twigg Industries, Inc., Brazil, Ind., as industrial engineer.

Robert Jensen, appointed branch manager, Baltimore, for Kaiser Aluminum & Chemical Sales, Inc.

V. Lee Cook, named president, Electronic Protection, Inc., Chicago.

George Trivan, appointed general traffic manager, Gar Wood Industries, Inc.

H. W. McMeken, appointed director of technical advertising and public relations, Jarvis Corp., Middletown, Conn.

S. A. Huffman, appointed superintendent, mechanical maintenance, Reserve Mining Co., Duluth, Minn.

Robert E. Bader, elected executive vice-president, Emil Greiner Co., New York.

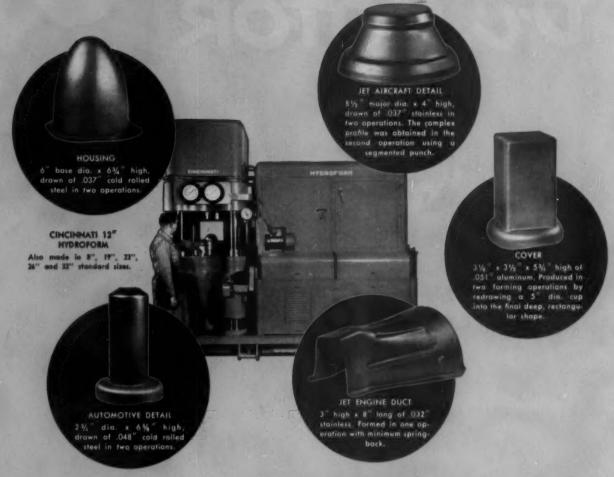
Dr. Robert Steinitz, appointed director of research, American Electro Metal Corp., Yonkers, N. Y.

Edward L. Lee, appointed general manager, Structo Systems, Elyria, Ohio.

Norman B. Kahn, elected vicepresident and treasurer, Brown-Strauss Corp. Norman Strauss, named secretary.

Paul W. Brannon, appointed manufacturing vice-president Cloyes Gear Works, Inc., Cleveland.

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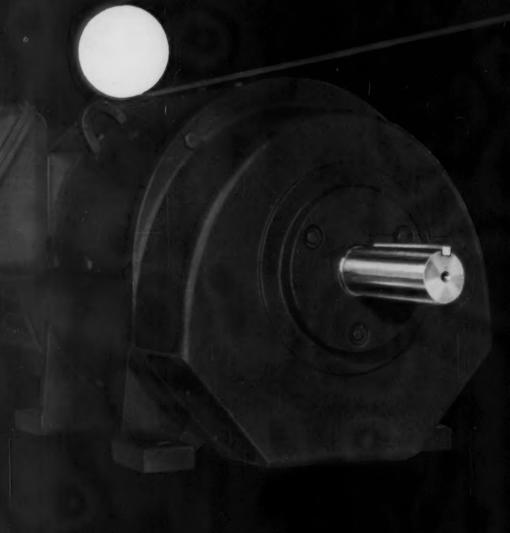
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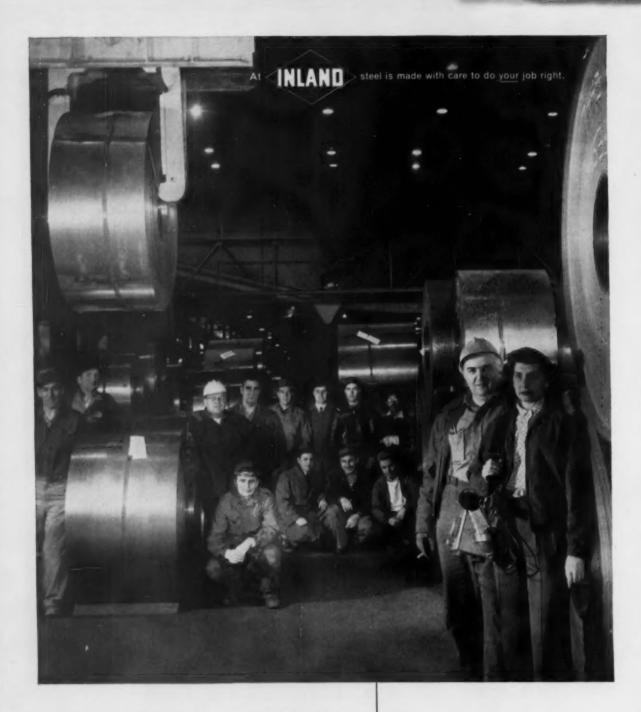
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C-1491

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Less contaminating-

Welding Titanium Without Filler Rod Improves Joint Efficiency

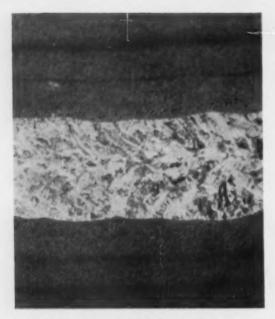
- Welding commercially-pure titanium without filler rod has resulted in joints with characteristics better than those where filler rod is used . . . Tests were convincing enough to adopt the technique for limited production of turbo and ramjet parts.
- ◆ Without filler rod, the argon blanket remains unbroken and symmetrical, affording better weld protection . . . Characteristics are further improved by other modifications . . . Technique seems practical for titanium alloys.

By A. V. LEVY, Supervisor, and ROBERT WICKHAM, Welding Engineer, Material & Process Section, Marguardt Aircroft Co., Van Nuys, Calif. ♦ INERT GAS-SHIELDED tungsten arc welding of titanium has become a well-established procedure, as has the use of filler rod stripped from the base metal. To reduce weld grinding on some critical parts for turbojet and ramjet engines, the Materials & Process Laboratory, Marquardt Aircraft Co., Van Nuys, Calif., investigated manual welding of titanium sheet without filler rod addition. The results showed that better joint characteristics are obainable by this welding technique.

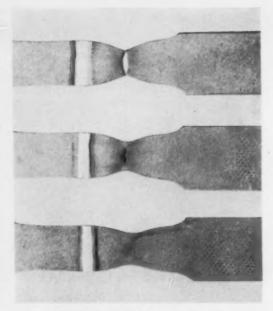
The problems associated with grinding welds in titanium were those of severe grinding wheel wear and the excessive time for metal removal. Also, the metal had a tendency to overheat, causing localized embrittlement of the weld.

TEST SETUP is simple in its makeup, but certain variables must be controlled closely. Dimensions of backup groove, and shape and spacing of chill bars are critical.





ENLARGED VIEW of weld in titanium sheet shows clean, bright surface obtained by welding without filler metal. Chill bars have a marked effect on reducing heat-oxidized zone.



TENSILE SPECIMENS of joints made without rod necked and fractured in base metal in every test. Weld strength ranges from 100 to 110 pct of the base metal tensile strength.

In some cases, this required removing the embrittled area and reworking the part. In other cases, the part had to be scrapped. Elimination of grinding considerably improved the quality of welded titanium parts.

The material welded was 0.040 in. MST Gr. III commercially-pure titanium which had been annealed and pickled. Joint edges were sheared and tight butted with no gap.

Flush welds made in the first tests exhibited considerable improvement in ductility over welds made with filler rod under similar conditions. Weld shape was much better also. Refinements in welding conditions improved the welding characteristics further.

Welds were flush on the top surface and slightly concave on the underside. There was no dropping or undercutting of the weld as commonly occurs when steel is welded without filler rod. The weld metal color was silvery in appearance, indicating little or no atmospheric contamination.

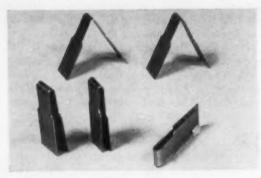
Bend tests made parallel to the weld and tensile tests made across the weld, the results of which were compared to those of welds made with added metal, showed decided improvement in ductility with little loss of tensile strength. Ducility of the joint approached that of the base metal while joint efficiency remained above 100 pct.

Loss of ductility in welds made using filler rod is attributed to absorption of oxygen, hydrogen and nitrogen from the air. The explanation is that the filler rod extends a path through the argon blanket which permits air to reach and contaminate the weld puddle. Without filler rod, the blanket remains unbroken, affording more effective weld protection. In addition, the oxide layer on the rod itself is eliminated.

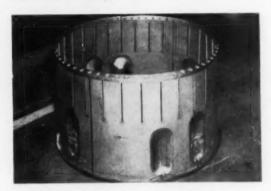
The absence of a dropping and undercutting is prevented by the backup argon pressure. Originally, the pressure used was somewhat high, resulting in a slight concavity on the weld underside. Excellent fluidity of the molten titanium also aided in obtaining a smooth, flush weld.

Subsequent tests showed that joint properties could be vastly improved by modifying the welding variables. For example the copper backup bar used in the first tests had a ¼ by ½ in. U. groove. The titanium deposited a slight smut on the copper bar which built up and eventually contaminated subsequent welds.

The high-conductivity copper used for the bar sapped enough heat from the weld to require an increase in welding current. This resulted in added weld contamination. Use of a low-conductivity mild steel backup bar retarded this chilling effect and permitted a re-



LONGITUDINAL bend samples of welds made without rod (bottom) have superior ductility. Sample at bottom right was bent over a 2T radius to 190° without failing.



TURBOJET engine parts welded without rod have been successfully subjected to high-strength service. Thus far, welding without filler rod has been used for limited production.

TABLE I Bend Angles to Failure

	Bend	Bend	Bend
	Parallel	Across	at 45°
	to Weld	Weld	to Weld
Welded with rod Original test without rod Final test without rod Base metal	115° 160° 190° 180°	115° 145° 190°	65° 120° 190°

TABLE II Color Indications of Weld Ductility

	Bent to Failure
Weld Surface Color	(over 2T radius)
Silver	180° + (no rod)
Silver	115° (rod)
Light straw	88°
Dark straw	71°
Light blue	66°
Dark blue	21°
Gray blue to free scale	0°

duction in welding current from 70 to 25 amp on 0.040 in. thick material. The lower heat level reduced air contamination of the weld metal.

Heat transfer characteristics of the backup bar were also changed to a marked degree by varying the size and shape of the groove. Optimum dimensions varied with the thickness of metal to be welded. Three times the metal thickness, in both the groove width and depth, proved best for obtaining maximum weld ductility. Backup bar thickness was ½ in., and variation of this dimension had little or no effect on the weld.

Pickling, brushing reduce contamination

The original hold-down or chill bars were made of mild steel, ½ in. thick by $2\frac{1}{2}$ in. wide, chamfered on the weld side at 45° to ½ in. thick. Chamfering to a 1/16 in. thickness on the weld side enabled the bars to be placed closer to the joint. This practically eliminated the bluish color in the heat-oxidized zone on each side of the weld.

Only solvent cleaning was used on the initial test pieces. Later, a 4-pct hydrofluoric acid and 40-pct nitric acid bath was used to pickle the titanium sheet before welding. The sheet was first dipped to visually remove scale, withdrawn, then rinsed in running cold water. This was followed by a hot-water rinse to facilitate drying.

Immersion time varied from 1 to 15 minutes, depending on the activity of the bath. This treatment removed visible surface oxide and reduced weld contamination. Wire brushing, using a stainless steel brush, was even more effective than acid pickling in removing oxide from the joint area. Oxygen and nitrogen contamination in welds were practically eliminated by wire brushing. Welding after acid pickling or wire brushing gives much better results than welding the material in the as-received condition.

Several different argon flow rates were used to determine their effects on the weld face. The absence of filler rod gave a symmetrical gas pattern and more effective protection. The argon flow rate is critical and must be varied with metal thickness and machine settings. With greater metal thickness, current and argon flow must be increased.

Too high a pressure results in two undesirable conditions. The fused joint has depressed areas along its face caused by the high argon pressure. In addition, the close spacing and shapes of the chill bars create a gas flow pattern having a tendency to roll contamination air toward the joint.

Reduction in the flow rate to a critical value resulted in optimum joint protection. The effect of argon flow on material 0.050 in. and thicker is particularly important. On 0.040 in. thick

material, the flow rate was reduced from 20 cu ft per hour in the original tests to 12 cu ft per hour in the final tests.

The use of argon for the root side of the weld is the key to satisfactory welding without filler metal addition. It serves a dual function—to protect the root side from atmospheric contamination, and to prevent fluid weld metal from dropping through and forming a protrusion on the bottom side and a depression on the top side.

Backup pressure must be closely controlled. If the pressure is too great, the weld root will be concave and will contain pits at the gas port positions. Argon flow must be regulated according to the metal thickness. Optimum flow rates vary from 1 to 5 cu ft per hour for each 6 in. of joint length. For the 0.040 in material, the flow rate was reduced from 10 cu ft per hour in the original tests to ½ cu ft per hour in the final tests.

The method of distributing argon along the backup groove at low flow rates is extremely important. Gas ports along the backup groove are 6 in. apart, with the first port located about 2 in. from the edge of the sheet. Length of the argon tube to each port is also critical. For equal pressure throughout the backup groove, all tubes from the manifold to the gas ports must be the same length.

Properties improve generally

The principal shortcoming of fusion welds in commercially-pure titanium has been low ductility. Tensile strength has been equal to that of the base metal or a little higher, assuring joint efficiency of 100 to 110 pct in a sound weld. However, ductility of a joint made with filler rod can range from zero elongation in 2 in. in a totally embrittled weld to 15 to 18 pct in an exceptionally ductile weld. Bend ductility is also affected, generally being a little less than that of the base metal. Welding without rod has changed this considerably.

Because the weld metal is stronger than the base metal, a standard sheet metal weld test is not indicative of actual weld strength. The base metal necks and fractures before the weld metal. Fracture strength is that of the base metal, averaging to a yield strength of 84,500 psi, an ultimate tensile strength of 102,500 psi and elongation in 2 in. of 18.5 pct.

Welds made with filler metal added prenecked at the weld zone and then tested to fracture. These specimens exhibited a weld zone tensile strength of 130,000 psi and local elongation at the weld of about 8 to 10 pct. The properties of a weld made without filler rod are believed to lie between the two sets of values, probably near those of the base metal.

A hardness traverse of the base metal, heataffected zone and weld metal showed that the heat-affected zone and weld metal were slightly softer than the base metal. Average hardness of the base metal was 21.5 Rc. The heat-affected zone was 17 Rc and the fused zone was 19 Rc.

Bend testing of a sheet metal fusion welded specimen is an excellent indication of its ductility. The welded samples were bent over a radius twice the metal thickness. Table I summarizes the results.

Color indicates ductility

Ductility of a welded joint in titanium can be determined roughly by the color of the weld surface. This applies to original welds only, not to rewelds. The amount of gas contamination and resultant weld embrittlement is indicated by the thickness of the surface oxide layer. As this oxide layer grows in thickness, it goes through a scale of colors similar to that on steel. Table II lists these colors and the resultant bend angle to failure.

Specifications for welding titanium at Marquardt limit acceptable welds to those with a light straw or bright silvery color. A dark straw, blue or gray color, or free scale, on the surface is cause for rejection. The bright silvery appearance is much easier to obtain when no welding rod is used than when rod is used.

A metallographic study of joints made with and without filler metal disclosed some marked differences in microstructure of the two welds. The weld made with filler rod consisted of a typical coarse-grained basketweave alpha structure, an area in the heat-affected zone of coarsened grains of acicular alpha and a base metal structure of fine grain equiaxed alpha with some acicular alpha. These are typical structures in titanium sheet metal fusion welds.

Lower heat input

The microstructure of the weld made without rod addition differed primarily in two respects from the weld made with rod. The area of the coarsened acicular alpha structure in the heat-affected zone was smaller and more sharply defined. There appeared to be some needles of retained beta in the fused zone basketweave alpha. These are evidences of the lower heat input and faster cooling.

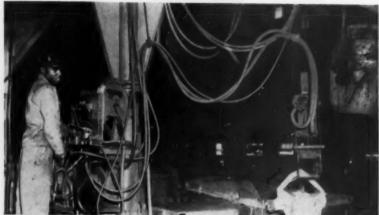
Welds made without rod addition have been used in limited production and have performed successfully in service. To date, these have been used principally on longitudinal tight joints in commercially-pure titanium 0.062 in. thick or thinner. It is believed that welding without rod, either manually or automatically, will be suitable for the weldable titanium alloys as well as commercially-pure titanium. With a universal type machine, it will be possible to weld titanium longitudinally, circumferentially or to a contour over a wide range of thicknesses without adding filler rod.

Industrial Rubber Hose: How to Increase Service Life, Lower Costs

◆ Costly production shutdowns can and often are caused by accidental hose failure due to accidents, over-stressing and improper use . . . A better understanding of industrial rubber hose, its components, the types available and proper maintenance will increase hose life, reduce downtime.

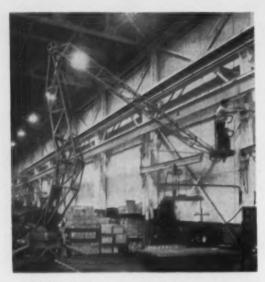
By C. M. SCHOLZ,

Assistant to the Manager, Industrial Rubber Div., Thermoid Co., Trenton, N. J.



March 17, 1955

AIR HANDLING system in foundry is one of many applications for industrial rubber hose.



JEEP-MOUNTED boom controlled from operator's station at end of boom by hydraulic hose.

◆ INDUSTRIAL RUBBER HOSE is one of the forgotten wheel-horses of metalworking. Yet on it depends the successful operation of many types of automatic machines and industrial trucks. Even a moderately sized plant uses thousands of feet of rubber hose representing a large capital investment. By proper selection and care, hose life can be increased and cost savings made.

A better understanding of hose, its components, the types available, and good maintenance procedures will increase hose life and reduce downtime because of hose failure.

The standard rubber hose consists of an inner tube, a carcass of fabric or cord and a cover. The composition of the rubber of the inner tube determines what material can be carried. The kind and thickness (number of plies) of the carcass limits the pressures. The cover is designed to withstand the various working conditions encountered in industry.

Rubber in the tubes can now be compounded to resist attack by oil, butane, propane, acetylene, insecticides. paints, lacquers, mild acids and a host of other chemicals. Tubes are also compounded to meet various abrasion and heat resistance requirements.

When a hose must carry gases or liquids under pressure, a reinforcing carcass of cotton, rayon, nylon or steel is wound or braided around the tube. The higher the pressure, the more reinforcement is required. For extremely high temperatures encountered in the material being carried or the working environment, asbestos may be incorporated in the carcass.

The carcass is protected from moisture, abrasion, oil, impacts and sunlight by the

cover. The cover also helps identify the hose and makes for better appearance.

Present standard uses of hose in metalworking plants include those for gases such as compressed air, oxygen and acetylene; for liquids such as water, gasoline, oil, coolants, acids, hydraulic fluids and for solids such as sand for blasting and slurries of solids in water and other liquids.

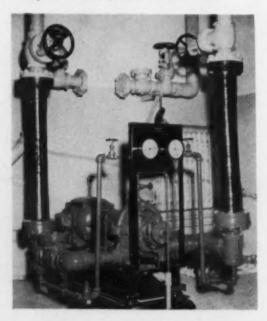
Those responsible for specifying hose should analyze its use in their plants to determine whether it is more economical to standardize on one hose type suitable for many materials in addition to water and air—or to have two types available—one for water and air use only and one for other materials.

Standardizing on a versatile hose would mean using a better hose than absolutely required for air and water. Against the greater first cost, the user should consider the longer hose life that would result which would reduce the cost. Using one type would also permit quantity purchases and simplify inventory control. With only one hose for all uses, the chance of incorrect use and consequent hose damage is eliminated.

The same approach should be made to hose usage regarding pressure. With most systems for operating air tools, the pressures do not require hose with a capacity for over 200 psi. Most water systems operated at less than 200 psi so that a hose capable of handling around 200 psi would serve most needs.

Standardizing on one hose type that will handle most of the tasks in the shop also means

LENGTH of specially-designed hose placed between pump and steel pipe absorbs a high percentage of vibration, water hammer effect.



TIPS

For Longer Hose Life

 Keep hose away from hot pipes, stoves and hot pieces of equipment wherever possible. If contact can't be avoided cover the hot spot with asbestos.

2. Strong direct sunlight speeds up exidation and should be avoided.

3. Oil and grease are detrimental unless the hose is specifically designated as oil resistant.

4. Cut out a badly worn spot before an actual failure occurs and install a new coupling.

5. At vehicle crossings have should be carried everhead or in under-ground conduits.

6. When not in use store hose flat on a floor rolled in colls of large diameter to avoid kinking. Rolls should not be so large that the weight of the cells will crush and weaken the bottom layers.

7. For temporary storage hang hose on wall brackets not nails. Adequate support in more than one place is required to prevent sharp bends. Hooks or other supports should be of sufficient diameter so the hose is not subjected to excessive distortion at the point of contact.

8. Use valves or nextles for control of flow. Avoid kinking or bending hose sharply to step flow.

that in an accidental hose break, a replacement hose will be readily available from stock.

Until a few years ago about 18 types of molded hose were needed to serve industry. Through the use of improved rubber compounds and stronger reinforcing yarns the Thermoid Co. has developed a line of five hose, called the "Basic Five," which are applicable to 90 pct of industry's hose problems. This does not include hydraulic hose designed especially for transmitting power and impulses by hydraulic means.

New, special and ingenious uses of hose in various branches of the industry attest to the progress that is being made in the design and manufacture of rubber hose. Special hose is required for about 10 pct of industrial hose applications today.

Present day techniques in rubber hose manufacture make it possible to handle any material that can be pumped. Sufficient bursting strength can now be built into a hose to withstand high pressures by metal or fiber braid reinforcement in the body.

The development of hydraulic fluids and high pressure hydraulic hose has made possible the precise control of a variety of machine tools, fork lift trucks, hoists and in many aspects of automation. Hydraulic hose for these applications withstand high pressures (up to 4500 psi) and also resist dimensional changes from high and low temperatures and pressures.

There are four principal types of hydraulic hose available today: high pressure wire braid hose (4500 psi max), a wire braid hose with a cover of specially treated cotton yarn (3000 psi max), medium pressure rayon braid hose (1200 psi max), and low pressure rayon braid hose (500 psi max).

Select couplings with care

Operating temperatures for hose of this type range from -40°F to 275°F. In addition, a special hose with wire spiral reinforcement to prevent collapse in suction is manufactured to return hydraulic fluid to the hydraulic pump.

Couplings must be selected with as much care as the hose itself. They also can be standardized. The many types of hose couplings available are composed of different kinds of metal, are built to withstand various pressure ranges to provide flexibility, and include quick-disconnect types, reusable and one time-use types. After the right type for a specific application is chosen, the correct size is the next consideration. Too large a coupling will unnecessarily overstress and weaken the hose. A coupling that is too small will not give a tight fit. Installation of the couplings should be made by experienced personnel.

Water or other fluids may set up harmful vibration and the "water hammer effect" when pumped through metal pipes. To overcome this, the T. R. Finn Co. has developed a special rubber hose of large diameter in varying lengths to reduce the noise and vibration carried from the pump to the pipe.

At each end of the hose an integral flange with a rubber covered metal disc is used to connect the hose to the flanges of the metal pipes which it interrupts. Not only does this type of hose reduce vibration and noise, but it prevents galvanic action when used to connect pipes of dissimilar metals.

All the savings made by standardizing hose and couplings may be nullified by improper maintenance. Maintenance begins as soon as the roll or length of hose is received from the railroad or truck line. If the hose is not being used immediately, store inside out of direct sunlight in the original wrapping.

When the hose is to be used, unwrap and uncrate carefully. Don't slash at the binding with a knife, since this may cut gashes in the new hose. If delivered uncoupled, make sure the correct type and size of couplings are used. Check the length required before cutting. Use a sharp cutting tool and cut the hose square. Make sure the coupling is properly placed on the hose, that is inserted all the way in, that the securing clamps are tightened and retightened after a short period of use.

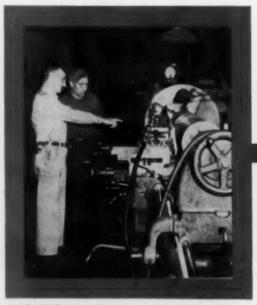
If the volume of coupling is large, a hose shop should be set up with proper tools and suitable personnel trained. If your organization uses thousands of feet of hose regularly, the value of a hose installation and maintenance crew should be investigated.

CARBIDE PROGRAM Slashes Tool Breakage Costs

Machine No. 186	. Naterial
Tool Types	Carbide Gr
lorued	Returned
To	al Condition
Good Fidges	Good Edges
Chipped Edges	Dell Edges
	Chipped Edges
Operator	Attendant:
Clack Number	
Statement of Transfer	Tool Condition
This tool transferred	Good Edges
to(Clock No.)	Dell Edges
Oper, Receiving Tool	Chipped Edges
Romarks:	
	Supervisor's Signature
Salvagable	☐ Scrapped

CARD record, issued with each new carbide tool, carries complete story of use and condition.

- Excessive carbide tool breakage is costly, usually stems from accumulated faulty practices . . . This firm took corrective steps, cut breakage losses 52 pct in four months.
- ♦ Variety of tools on inventory was reduced . . . Mechanical inserts were used to save regrinding . . . Biggest benefits came after training machine operators in efficient carbide practices.



MACHINE shop foreman and operator discuss carbide tool practice and coolant application.

By G. E. LOFTIN, Superintendent, Special Products Div., United States Pipe & Foundry Co., Burlington, N. J. • A CLOSE LOOK at carbide cutting tool costs at the Special Products Div., United States Pipe and Foundry Co., showed them to be higher than was felt necessary. An average of 10 pct of the tools were being broken monthly at the Burlington, N. J. machine shop.

Although the shop machines tough materials (chilled iron at 550 Brinell, AISI 300 and 400 series stainless, low alloy steel, etc.), diagnosis of breakage causes showed that much of it could be eliminated by better practices. Most of the shop's work is rough turning on rolls and cylinders with conventional single point carbide cutting tools.

First corrective step was a survey of carbide tool practices. Were tool shapes and tip sizes adequate for the work done? Were grinding practices acceptable? Were there any special shapes on inventory that could be replaced by standard tools?, etc. Another important consideration was the number of brazed tip shapes that could be replaced with the new mechanically mounted insert tools.

The survey showed that (1) a chip breaker grinder needed repair; (2) some tool shapes could be eliminated from inventory; (3) several brazed tip shapes could be replaced with a single type insert tool. Although grinding practices were generally found to be good, it

was discovered that many tools were reground to so small a size that heat concentration in the cut melted the braze

This excessive regrinding was done because existing tool reconditioning facilities could not supply enough replacements. One solution would have been to increase facilities, but this action was delayed. It was felt that by reducing the number of tool shapes, cutting breakage of mechanically mounted tips and concentrating on better machining practices, this demand pressure would shrink.

As previously mentioned, several tool shapes differed only by slight variations in angles or chip breaker design. Eliminating these "overlaps" narrowed the inventory and stopped a situation which had grown over a period of years due to lax tool control.

Further inventory study showed that over 50 pct of brazed turning and facing tools could be replaced by either mechanically mounted inserts or button-type carbide cutting tools. For all roughing cuts on "as cast" surfaces, a button-type tool was recommended. Carbide inserts were recommended for secondary roughing and finishing. This prevented the possibility of chipping an insert on interrupted cuts.

After taking these steps to improve tool preparation, next action was to improve operator knowledge and machining techniques.

Arrangements were made with the Kennametal Co. to conduct an in-plant carbide tool training program. This was to familiarize all operators with latest developments and techniques in using carbide tipped tools.

To insure operators a free discussion of their machining problems, separate sessions were held for operators and supervisors.

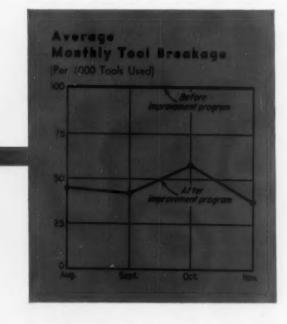
With tool preparation and machining practices improved, it was only logical to develop a simple yardstick to follow results. Since only single point tools were used on straight turning work, breakage variables were reduced to (1) man, (2) material and (3) machine.

Compare performance

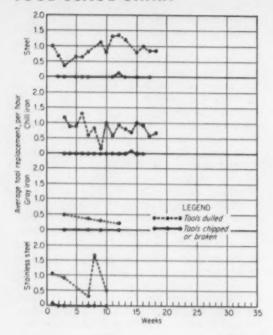
By following each operator's performance, a comparison could be made with other operators on the same shift working on the jobs. The comparison could also be extended to men on other shifts operating the same machine on like material. No two metals have the same machining characteristics, but all metals with high tool breakage incidence were flagged for close attention. Similarly, a high breakage rate for some operators yielded information concerning faulty performance.

To compare certain variables, a simple tool control program seemed desirable. The planning committee consisted of the Plant Industrial Engineer, Plant Engineer and Special Products Division Superintendent.

As finally prepared, the tool control plan



TOOL USAGE CHART



consisted of a record card to be maintained, for each tool withdrawn. This also identified the operator, machine, type of metal and the tool's condition on return.

With this system, an operator draws his tools and matching cards from the tool crib. The operator and tool crib attendant both verify the tool's condition at time of issue, noting this on the card. The tool is used until it is dull, chipped or broken. It is then returned to the tool crib where its condition is again verified and noted on the card. The operator is then entitled to obtain another tool and card.

Card space is provided for noting tool transfer between operators, when a tool in a machine is taken over by another man at a change of shift. If a tool is chipped or cracked, a new tool will not be issued until the operator's supervisor enters the damage conditions on the proper card. If the supervisor thinks the tool is salvagable, he checks this card square. If he believes the tool is beyond repair he checks the box marked "scrapped."

To maintain a constant tool inventory, each operator was issued four tools at the start of the control program. He is held accountable for these tools at all times. He may exchange one or all of these tools as his work dictates, but he must always have four tools and cards in his possession. Four tools were decided on because this number can be conveniently carried and tool crib traffic is reduced.

Completed cards are delivered to the

Superintendent's office. A clerk compiles tool use and breakage data on a form and chart to provide a complete picture of past and present conditions.

Because the shop had operated for five years with little or no tool control system there was a problem of just how to sell the new program to the operators. Since full cooperation was necessary for even moderate success, it was decided to hold a preliminary discussion period.

At this discussion period, cost facts were laid on the table; operators were told exactly what tool breakage was costing and what saving was thought possible with close control. It was explained that data on operators and machine performance was necessary to determine a basis for action in reducing breakage.

This discussion period cost about 30 manhours on an overtime basis but the thorough understanding it brought about resulted in a successful start for the program.

The operator's meeting was held on a Friday and the program was planned for installation on the following Monday. The intervening Saturday was used to establish an inventory level in the reorganized tool room setup. When men reported for work on the scheduled Monday they were issued four initial tools.

Interest in the program was immediately apparent; foremen were peppered with questions about proper tool usage. Each man knew he was to be compared with other operators.

Tool breakage dropped

Throughout the installation period, a representative from the Industrial Engineering department stayed in the shop to follow administrative practice and clear up questions about the program.

With the complete plan in operation it took only one month to show that it was highly successful. Data so far shows that average tool breakage per month has dropped 52 pct for a considerable reduction in tool cost.

Before installation of better practices and closer control, tool breakage averaged 100 per 1000 tools per month. After the plan went into effect, breakage dropped immediately to an average of 48 per 1000 tools per month. Considering that a broken tool costs the firm about \$5.00 to replace, this meant a \$260.00 saving per month per 1000 tools. A saving of this size soon absorbs the cost of the control installation and easily pays for subsequent maintenance.

Aside from the cost reduction angle, increased operator interest in good machining practices makes the supervisor's job easier. Considerably more attention is paid to tool performance, and this data is readily available and prepared in an understandable manner.

Standard Multi-Purpose Tool Machines and Assembles Small Parts

♦ USING INDIVIDUAL machine tools on secondary operations meant high costs for making windshield wiper motor housings at Owen-Dyneto Div., The Electric Auto-Lite Co., Syracuse, N. Y.

Five machining operations and one assembly are required on right and left hand diecast blanks for the motor and housing. The assembly consists of inserting an Oilite bushing into the motor shaftway. For proper assembly, the end of the shaftway must be spot faced to a 5%-in. diam, and the ID of the Oilite bushing sized down between 0.3735 and 0.3745 in.

The machining operations require drilling four 0.120-in. diam holes and one 0.1235-in. diam hole; also tapping two No. 10-32 holes. Tolerances on the drilled holes are ± 0.001 in. for size and ± 0.002 in. for location. Tapped holes are class 2.

Because it took 5 operators and considerable floor space to perform these operations, the firm decided to invest in a multi-function machine. Object was to have one operator do all the machining and assembly.

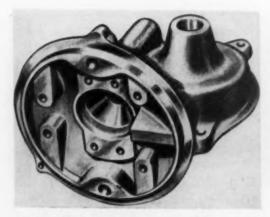
To make the investment worthwhile, such a machine had to be capable of drilling, tapping, reaming, milling, turning, screw inserting and similar machining and assembly operations. It had to be a standard machine that could be tooled for other high production jobs and the customary frequent model changes.

A standard machine could also be promptly field-serviced with stock factory parts.

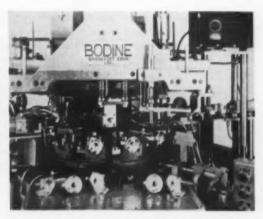
To meet these requirements a machine consisting basically of an accurately indexed dial table, a cam controlled, synchronized vertical drive, and easily placed, fully adjustable spindles was supplied by the Bodine Corp., Bridgeport, Conn. Only slight modifications were necessary to adapt it to the Owen-Dyneto operation.

With the new equipment the manufacturer is able to get the required production with one operator instead of 5 and with a 60 to 70 pct saving in floor space. Set-up and inspection time are also reduced.

In operation, the machine makes one piece per stroke. At 20 strokes a minute, production is 1000 pieces in a 50-minute hour.



ONE MACHINE performs six operations on this motor housing, completes 1000 parts per hour.



HOUSINGS are automatically clamped, machined and unclamped in fixtures on the dial table.

Modern Hydraulic Systems Offer Accurate, Automatic Control of Speed, Torque and Power

By ROBERT SMILGES, Hydraulic Design and Field Engineer, The Denison Engineering Co., Columbus, Ohio

Hydraulic systems have shown extraordinary versatility in a host of modern machine applications
 . . . Speed, torque and horsepower can be accurately controlled between wide limits . . . First step

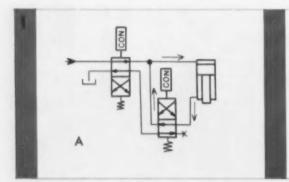
in approach to design of a hydraulic system is analysis of basic methods of speed control . . . Here are fundamental hydraulic circuit arrangements which may be used as a guide in designing.

◆ TREMENDOUS GROWTH has taken place in the field of industrial hydraulics during the last five years. A principal reason for this growth is the versatility of hydraulic systems. Speed, torque and horsepower can be accurately and automatically controlled between wide limits. Modern hydraulic power is simple, rugged, easily serviceable, sensitive, quiet and smooth. Hydraulic drives offer long life, compactness and economical operation.

The designer of hydraulic drives has great latitude in selecting component pumps, controls and valves. Before choosing components, however, the designer should analyze basic methods of speed control with respect to his particular application.

Speed of a rotary fluid motor is determined by the amount of fluid passing through the motor and the displacement of the motor. Speed of a cylinder ram is determined by the amount of fluid entering or leaving the cylinder and the effective areas of the piston. Speed can be varied by changing the displacement or effective area of the driven unit, the amount of fluid directed to the driven unit or both.

A method of obtaining a two speed system from a fixed displacement pump by varying effective areas is illustrated by a circuit widely



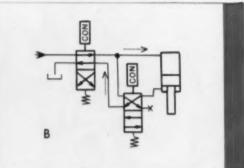


FIG. I—Hydraulic presses often use circuit shown at A to obtain fast ram approach speed. By porting to reservoir, as at B, pump delivery then acts on full area of the piston.

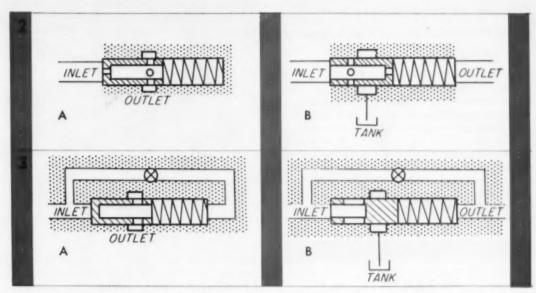


FIG. 2—(Top, Left and Right) Simple flow control valve (A) with inlet and outlet ports. Three port fixed flow control valve is shown at B. Third port is tank or reservoir connection for flow regulation.

FIG. 3—(Bottom, Left and Right) Two port valve (A) and three port valve (B) use variable orifices to regulate flow.

used in hydraulic presses where a fast approach speed of ram to work is desired. Fig. 1 (A) shows a circuit of this type. The bottom side of piston is connected back to the top side so that the pump delivery acts effectively on the ram area only. At the desired speed change point, the bottom side of the piston is ported through appropriate valving to the reservoir so that the pump delivery then acts on the full area of the piston Fig. 1 (B). Full tonnage can be exerted and cycle time reduced. The amount of fluid directed to the driven unit can be varied in four ways: (1) Flow control valve system. (2) Variable delivery pump system. (3) Multiple pump system. (4) Combination of these systems.

Flow control valves can be used to regulate the amount of fluid received by the driven unit from a fixed delivery pump or from an accumulator system. Fig. 2 (A) shows a simple fixed flow control valve with inlet and outlet ports. The amount of fluid that can flow through the valve depends on the orifice size and the spring force.

Whenever fluid flows through a restriction, there is an accompanying pressure loss. For a fixed orifice, the pressure differential across the orifice increases with increased flow. This pressure differential creates a force tending to move the piston against the spring. When the piston moves, it begins to restrict the outlet. Thus, for varying input pressures or varying outlet loads, the piston will open or close

the outlet port to maintain a constant differential pressure across the fixed orifice. This results in a constant flow through the valve. A piston of this type is called a compensating piston. With this two port type flow control, excess pump volume must be disposed of Kthrough some other circuit component such as the system relief valve.

A three port fixed flow control valve is shown in Fig. 2 (B). The third port is a tank or reservoir connection. The outlet in this valve is not restricted to regulate flow as with the two port valve. Flow is regulated instead by disposition of excess flow through the tank port.

Basic circuits for flow control valves

Variable flow control valves operate under the principles described above; a variable orifice is used instead of the fixed orifice. The two port valve is shown in Fig. 3 (A), and the three port valve in Fig. 3 (B).

Three basic circuits used with flow control valves are the meter-in, meter-out, and bleed-off circuits. Fig. 4 (A) illustrates a fixed displacement fluid motor as the driven member in a meter-in flow control circuit. The relief valve should be set high enough to handle peak loads on the motor but never set above rated pressure of components.

If a two port flow control valve were used in this circuit, the pump would always be operating at relief valve pressure since pump delivery would be greater than the output of

Three port valve makes a more efficient circuit where only one valve is metering-in . . .

the flow control valve. Two port valves must be used where two or more valves are metering-in from a single source.

A three port valve makes a more efficient circuit where only one valve is metering-in. Excess oil is disposed of through the tank port of the flow control valve at working pressure. The relief valve in this circuit acts as a safety valve and only operates when an overload is encountered. This circuit may be used to ad-

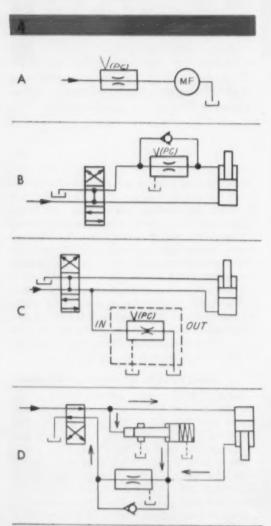


FIG. 4—Fixed displacement fluid motor used as driven member in meter-in circuit is shown at A. A meter-out circuit with driven ram is shown at B. At C is a bleed-off circuit. Differential relief valve used in circuit D helps make meter-out circuit more efficient.

vantage on a drill rig to turn the drill. Rotary speed is fully adjustable and the circuit fairly efficient (a must where cooling facilities are not available). There is overload protection if some solid obstruction is encountered; and the circuit is composed of simple, standard, economical components. The meter-in circuit is the only basic circuit where the three port valve can be used.

Fig. 4 (B) shows a meter-out circuit with a driven ram. A four-way valve and a check valve permit a return stroke of the cylinder. The relief valve should again be set high enough to handle peak loads. The forward speed of the ram is controlled by regulating the flow of oil from the discharge side of the piston.

This circuit is inefficient because the pump always operates at full load, spilling excess fluid over the relief valve. Its advantages are that the ram (tool) is restricted from lunging forward if the load is suddenly removed and that a negative work load can be supported. These advantages are requirements in certain machine tool applications such as drilling or climb milling.

The bleed-off circuit is shown in Fig. 4 (C). The fluid to be disposed of is metered through the valve at working pressure. Efficiency is the same as the meter-in circuit with a three port valve. Accuracy of this circuit is not as good, however, because any variation in pump delivery will be reflected in a speed change.

Differential relief valve helps

This circuit should only be used instead of a three port meter-in circuit where a cost saving can be realized. An example: Where it is desirable to regulate flow between say 60 and 80 gpm. A ¾ commercial flow control valve could be used to bleed-off the required amount. To do the same job with a meter-in circuit would either require a special valve or some multiple of smaller valves in parallel to handle the full 80 gpm flow.

The disadvantages of the meter-out circuit, poor efficiency and pressure intensification in the cylinder, can be partially overcome by adding a differential relief valve, Fig. 4 (D). These valves must be designed for each application.

The input pressure to the head end of the cylinder acts against the small area of the piston and the opposing force is supplied by the spring. This is a simplified arrangement of a conventional relief valve. The outlet pressure from the cylinder is allowed to act on another area of this same piston and in the same direction.

When the load on the ram is small and the pressure in the outlet end of the cylinder tends to build up, this pressure acts on the spring, in effect lowering the main pressure setting of the relief valve. If a negative load were

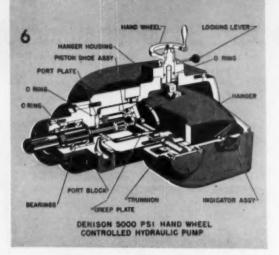


FIG. 6—Manual control using handwheel is the simple method of varying pump delivery used in this Denison 5000 psi hydraulic pump.

applied (where the ram is tending to be pulled faster than the regulated speed), the forward pressure would be lowered still further. Another approach to the problem of negative load or sudden dropping of load is to put a constant back pressure on the outlet side of the cylinder and use a meter-in or bleed-off circuit. This is done with a counter-balance valve, Fig. 5 (A). A variable speed bleed-off valve controlled by outlet flow is shown in Fig. 5 (B).

Second method for varying amount of fluid to the driven unit is by using a variable delivery pump. Delivery of an axial piston pump is varied by moving the cam plate angle to reduce or increase piston stroke. Radial piston pumps and vane pumps vary the eccentricity between rotor and stator to increase or decrease delivery.

There are four general methods of varying pump delivery: (1) Manual control. (2) Electric control. (3) Pressure control. (4) Servo control.

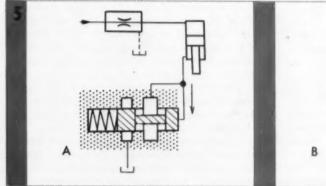
Manual control, as with a handwheel, Fig. 6 is the simplest method. Electrical operation is very similar to manual operation. A directional motor varies a cam plate angle by a screw and nut or worm gearing arrangement. Limit switches control maximum and minimum stops. This control can be very flexible and offers good acceleration and deceleration control possibilities.

The two basic pressure controls are cylinder and pressure compensating controls. A spring is usually used to keep the cam angle offset for maximum pump delivery. A piston acts against the cam plate in opposition to the spring, and fluid pressure is used to actuate the piston.

With a cylinder control, this pressure can be supplied by the main system or from a pilot source. Adjustable mechanical stops are usually provided for minimum and maximum flows. This control is widely used for two speed systems. The pressure compensating pump also uses a pressure actuated piston. The pump delivers full volume until system pressure reaches the pressure setting of the compensator. The pump volume is automatically reduced so that just enough output flow is delivered to maintain this preset pressure.

Some pressure compensating pumps can also be used for fixed two speed systems by adjusting maximum and minimum volume output stops. The pump then delivers maximum volume until a predetermined load is encountered. At this load or pressure setting, the delivery is reduced to the minimum setting. It remains there as long as the pressure exceeds the compensator setting.

Servo control pumps are fluid pressure operated. Fluid is directed through a servo valve to opposite ends of a piston. This piston varies the angle of the cam plate. Since this piston



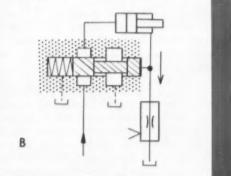


FIG. 5—Counterbalance valve (A) solves negative load problems. Constant back pressure is placed on outlet side of cylinder. At B is variable speed bleed-off valve controlled by outlet flow.

Where smooth reversal is needed, cross-center or reversing type pumps are used...

is double acting, a spring is not used to keep the cam plate offset. The fluid pressure can be system pressure or pilot pressure from an external source. For quick response and very delicate control, it is advisable to use a pilot source so that high pressure fluid is always available. The servo itself is most usually controlled electrically or mechanically. The servo valve is constructed so that it can be controlled with very small forces.

Cross-center or reversing type pumps are used where smooth reversal is required. They also help simplify circuit valving. The most widely used controls for cross-center pumps are stem, cylinder and servo.

Typical controls available

The handwheel control would ordinarily be used where speed changes were not frequently made or where quick volume changes were not necessary. Electric control finds its greatest use in remote applications. The amount of fluid delivered to the driven unit from both these pumps varies somewhat with load because of increased leakage at higher pressure. The stem control with a lever attachment is adaptable to frequent speed changes that are not of a critical nature. A power winch is an example of where this control is used.

Cylinder control finds use on machine tools having a fast approach speed and slower working speed. The speed changeover point can be regulated electrically, mechanically, or hydraulically. Pressure compensating control is ideal for holding or squeezing operations. The pump delivers full volume for fast approach speed and just enough volume at the working portion of cycle to maintain pressure. As some curing and holding operations last for hours, the excellent efficiency of this control provides real cost savings and virtually eliminates heat problems.

Servo controls versatile

Servo controlled pumps have many applications due to the small control forces envolved and to the versatility of servo control. The input signal to the servo control and the response to this signal are important. When accurate control of speed of a driven member is required under various load conditions, the input signal is usually modified by another signal from the driven unit. This "feedback" signal would, in the case of increased load and leakage, increase the cam angle of the pump the required amount. For very high response and accuracy, electronic signals can be used to drive a torque motor. The torque motor then controls the servo valve.

The third method of varying the amount of fluid directed to the driven unit is by using a multiple pump system. This system is usually used for two speed applications where the fast approach speed is made under light load. A high volume low pressure pump and a low volume high pressure pump both deliver oil to the driven unit until a predetermined load is encountered or until a fixed position is reached. At this time the low pressure pump is unloaded at virtually zero pressure and the high pressure pump is used for the feed stroke.

Generally, a fixed displacement pump and flow control valve or two pumps are cheaper in initial cost than a variable displacement pump with capacity to do the same job. The flow control valve gives better accuracy of control than a variable delivery pump (servo with feedback excluded). Variable delivery pump circuits are essentially meter-in circuits which means they are not suited for negative work loads. Pumps cannot be mounted as conveniently as flow control valves.

If a pump has to be located some distance away from the driven member, the compression of the fluid can cause very poor regulation under certain conditions. A properly designed variable displacement pump circuit, however, will be more efficient than a flow control valve circuit. The flow control circuit must dispose of excess fluid at all speeds other than maximum. Disposition of the excess fluid results in energy loss in the form of heat. When the cost of wasted power and heat exchangers are figured, the variable volume pump circuit may show substantial over-all savings.

Keep fluid clean, free of air

For good speed regulation and proper functioning of the hydraulic system, fluid condition is important. The fluid should meet the component manufacturer's recommendations. The fluid must be kept free of dirt and sludge which might cause the close fitting parts found in the flow control valves and pump controls to bind.

Air in hydraulic systems causes poor speed regulation. Entrapped air should be liberated at the reservoir, before being drawn back into the pump.

Temperature control is important for several reasons. Leakage generally increases with increased temperature because the viscosity of the fluid is lowered. Fluid viscosity changes affect flow control valves and pump controls. Good design can minimize these effects. High temperature operation causes quick fluid breakdown which can result in poor control due to gum and sludge deposits.

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A full line of air and electric hoists for handling bulk materials of all types is described in a comprehensive catalog. Outstanding features of each type and size are carefully outlined along with specifications, capacities, sizes, symbols and accessories available. Many applications in the general industrial field are illustrated. Ingersoll-Rand Co.

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Overhead cranes

A complete presentation of the wide variety of handling jobs being performed by Whiting overhead cranes is offered in a new booklet: Presenting Whiting Engineered Cranes. Whiting cranes are shown in action at foundries, railroads, power plants, steel mills and general industry. Whiting Corp.

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Improve welding

A new, enlarged 40 page edition of Tooling for Welding describes standard and special tooling, fixtures and machinery for high-quality, high-speed, low-cost welding. Includes examples of special purpose automatic welding machinery using submerged are and inert are processes. Cecil C. Peck Co.

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Barrel plating

Safer, faster, more economical barrel plating through automatic control is described in a new brochure. Both operation and performance of the new Hoffman automatic cut-off plating switch are described. Typical on the job applications are shown. Hoffman Plating Co.

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FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 121.

DynaShift lathe

Carbide tooling may be used to fullest advantage on the faster, more powerful Series 90 Dyna-Shift lathe described in a new bulletin. Simplicity of operation has been made possible by a new type of headstock drive which facilitates obtaining, automatically, the right surface cutting speed for any given work diameter. Copies of this bulletin (No. 1601) are available upon request. Use business letterhead in writing to the Monarch Machine Tool Co., Sidney, Ohio.

Write company on your letterhead.

Colloidal graphite

A revised 4-page bulletin, No. 421, containing photographs, diagrams, charts, and information on the advantages offered by colloidal graphite in the assembly and run-in of machines. The bulletin shows how to use colloidal graphite, chiefly in the form of a petroleum oil dispersion. Acheson Colloids Co.

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Industrial pumps

"Vertical versatility" is the key product descriptive phrase in a new 16-page bulletin which describes and illustrates the application of vertical industrial service pumps for liquid transfer from short settings in both industrial and process services. Peerless Pump Div., Food Machinery & Chemical Corp. For free copy circle No. 6 on postcard. p. 121.

FREE TECHNICAL LITERATURE

Annealing stainless

An illustrated bulletin, A-104, Continuous Annealing of Stainless Steel Sheets in Roller Hearth Furnace, describes furnace equipment installed in an eastern steel plant. The furnace operates continuously at temperatures up to 2100°F. Gasmaco patented silicon carbide radiant tubes and silicon carbide rollers are used. Gas Machinery Co., Industrial Furnace Div.

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Welded polyethylene

"Quality Control For Welded Polyethylene" is detailed in newly published literature. Availability and simplicity of certain key tests enable polyethylene fabricators to insure soundly contracted process equipment meeting the most rigid specifications. Engineering data and test methods are given. American Agile Corp.

For free copy circle No. 8 on postcard, p. 121.

Metalfinishing guide

A new guide to the use of Wyandotte products for metalworking and metal-finishing operations has just been issued. Simple directions are given for 12 major cleaning, stripping or processing operations. Under the 12 operations, 40 recommendations are given for products that fit various plant conditions. Industrial Dept., Wyandotte Chemicals Corp.

For free copy circle No. 9 on postcard, p. 121.

Boiler refractories

A new 20-page bulletin provides operators of stationary and marine boilers with an authoritative guide for selecting the most efficient and economical refractories for their boilers. The bulletin "Boiler Refractories" discusses basic requirements refractories must meet to avoid the chief causes of refractory failure. The Babcock & Wilcox Co.

Hydraulic transmission

A new two-page bulletin describes Vickers ¾ hp variable speed hydraulic transmission for industrial applications. Operational advantages and design features of the Series TR3 variable speed transmission are outlined. Vickers, Inc. For free copy circle No. 11 on postcard, p. 121.



Top Brass Says I'M GUILTY

In a way that's correct. Guilty of choosing the wrong protection. Fire hit and took off like lightning!

There's a moral to this: Protection that's good for one hazard can burn you out when applied to another.

That is why CARDOX years ago originated "Low Pressure Carbon Dioxide Systems"*—to give safe protection to industry's "hot spots", for which existing protection just wasn't good enough. Since then thousands of CARDOX Systems have been installed for just about every kind of flammable liquid and electrical hazard you can think of —and scores of Class A hazards as well. Fire savings to industry total up to many millions of dollars.

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... stopping ship corrosion



with Federated magnesium anodes. When designed and installed correctly, the low-cost anodes corrode and the high-cost ship does not. Saves thousands of tons of steel annually. Federated Metals has a Corrosion Advisory Service which works to help the marine, petroleum, natural gas and other industries. Literature available.

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to tighten ridge rope on trailer trucks. This eliminates the cumbersome and heavy iron ridge pole, a long-standing trucker's headache. Weighs less than seven pounds. Cast of Tenzaloy, a Federated-developed high-strength aluminum alloy, by Littlestown Hardware and Foundry Co. for East Akron Ratchet and Mfg. Co. Tenzaloy bulletin on request.





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FREE TECHNICAL LITERATURE

Power lubrication

Of tremendous importance to trouble-free operation of today's high-speed machinery is the modern lubrication system. A new leaflet describes Multi-Luber systems for power lubrication. These, both air and vacuum operation operated, provide complete lubrication at vital machine points. Lincoln Engineering Co.

For free copy circle No. 12 on postcard, p. 121.

Tape applications

Cost saving ideas for metalworking applications of pressure-sensitive tape fill this informative 52-page book. Applications in all major metalworking departments, including machining and finishing, electroplating stamping and fabricating, welding, assembly, painting, packaging, and maintenance, are included. Minnesota Mining & Mfg. Co.

For free copy circle No. 13 on postcard, p. 121.

Sectionized automation

A new illustrated booklet, "Sectionized Automation by Cross" has been released. This new development is based on the division of a machine into sections, any one of which can be shut down while the others remain in automatic operation. Loss of production due to stopping the machine to change tools and make minor adjustments is minimized. The Cross Co.

Vibrating screens

A complete line of vibrating screens for all medium and heavy duty screening operations is covered in a new Link-Belt Co. Book No. 2554. These efficient screens are used for scalping, sizing, dewatering and rinsing. Link-Belt Co.

For tree copy circle No. 15 on postcard, p. 121.

Precision dowel pins

An illustrated 4-page folder shows the company's complete line of precision dowel pins—both standard size and oversize. The line has just been repackaged and relabeled for convenience in ordering, stocking, and taking inventory. The folder gives prices and discounts for the complete line. Danly Machine Specialties, Inc.

For free copy circle No. 16 on postcard, p. 121.



It's Here—At Your Request. Yes, the tremendous acceptance of Cri-Dan "B" and Cri-Dan "D" has resulted in the development of a larger, heavier precision threading machine greatly extending the range of the Cri-Dan Single Point Threading Method. Not only precision threading but secondary turning, boring, facing and chamfering facilities are incorporated in the Cri-Dan E; complete hydraulic and electric controls assure maximum efficiency even on the heaviest applications. A quick check of the specifications will show the ruggedness and range

of this, the newest and finest Cri-Dan Single Point High Speed Threading Machine ever developed. Write The Lees-Bradner Company, Cri-Dan Division for specific information on the processing of your parts.

SPECIFICATIONS

Threading Range 2 TP1-48 TP1	Max. Taper of Thds 15° Included
Max. Thd. Dia, (Internal) 16" Dia.	Multi-Start Threads Yes
Max. Thd. Dia. (External) 12" Dia.	Spindle Speeds 50-1400 RPM
Max. Swing Over Ways 25" Dla.	Main Motor 20 H.P.
Max. Swing Over Tool Slide 12" Dia.	Floor Space Reg'd . 5'6" x 14'0"
Max. Thread Length 61/4" Length Between Centers	Approx. Weight 4½ Tons 2'6", 5'6" & 8'6"

CRI-DAN DIVISION



IF YOU THREAD OR HOB . . . GET A BETTER JOB WITH A LEES-BRADNER



"Machine tool production increased 35 to as much as 75 per cent"-users of leaded steels report. The addition of lead acts as a lubricant reducing friction between chip and tool. The beneficial results-faster machining speedsmuch longer tool life-and vastly improved product finish. With normal heat treating, mechanical properties such as yield strength, tensile strength and ductility are unaffected.

You can obtain similar manufacturing benefits by specifying Aristoloy leaded alloy or Ledloy* (leaded) carbon grades. Available in all A.I.S.I. or S.A.E. standard analyseswrite or call today for information about application of free cutting leaded steels to your products.

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FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 116

Aloyco 20 alloy

A new 8-page illustrated bulletin describes Aloyco 20 corrosionresistant valves. The bulletin incorporates recent field-test data on the austenitic alloy Aloyco 20 in various concentrations of sulphuric acid at different temperatures. Engineering specifications for Aloyco 20 valves and fittings are included. Free copies may be obtained by writing on your letterhead for Bulletin No. 8 to Alloy Steel Products Co., Inc., West Elizabeth Ave., Linden, N. J.

For your copy write on your company letter-head to address shown on reply card.

Temperature control

The fifth in a new series of bulletins describing temperature controls is now available. This bulletin describes Models VD-2S. VD-2C, and VD-2X. Each is a dual temperature control, incorporating two independent electric switches for operation up to 1800°F. All operate by the differential expansion of solids (two concentric tubes) and use no filled bulb or capillary tubing. Burling Instrument Co.

For free copy circle No. 17 on postcard.

Face milling cutters

A new catalog gives comprehensive descriptions of Lovejoy types A, H, J. L and C face milling cutters. Charts clearly show specifications, applications and catalog number of each type. Catalog is illustrated with photographs, drawings and sketches. Lovejoy Tool Co., Inc.

For free copy circle No. 18 on postcard.

Portable x-ray

A general purpose portable x-ray source, using radioactive thulium to produce x-rays, is described in a new data sheet. No external power is required. Built-in shielding assures personnel safety. Radiation intensity on center line of x-ray beam at 1 ft from source is 50 mr per minute nominal. Nuclear Electronics Div., Litton Industries.

For free copy circle No. 19 on postcard.

Pyrometers

Pyrometer supplies, including thermocouples and components are described in this new booklet. Engineering data and descriptions permit adaptation of these units to a variety of types of equipment. Arklay S. Richards Co.

For free copy circle No. 20 on postcard.

Fire resistant

Use of a fire resistant hydraulic fluid is imperative in many steel industry applications for safety reasons. A new leaflet lists physical properties, advantages, installation data and typical applications for Houghto-Safe nonflammable hydraulic fluid. E. F. Houghton &

For free copy circle No. 21 on pestcard.

Precipitator rapper

A new 6-page bulletin describes the MI Rapper, a device for automatic and continuous cleaning of the collection electrodes in a Cottrell electrostatic precipitator. A schematic diagram of the rapper and explanation of basic operating principles are shown. Research-Cottrell, Inc.

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Turn Page

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Rental-lease-buy plan

A new, 5-page illustrated brochure tells how materials handling equipment can now be rented, leased and purchased at amazingly low cost. The plan provides for rental of as much equipment as desired at an extremely low rate, with options to purchase equipment at the expiration of the leasing period, or receipt of full allowance of actual market value of equipment returned at the expiration of lease. Market Forge Co.

For free copy circle No. 23 on postcard.

Broaching machine

One of the most unusual and versatile broaching machines now available to the metalworking industry is described in a new 4-page bulletin. The machine, the Colonial "4" Convertible, is capable of horizontal pull broaching and vertical push and pull-down broaching and press work. Design, construction, and operating details are covered in Bulletin FW-55. Colonial Broach

For free copy circle No. 24 on postcard.

Temperature control

Effective and economical cooling of liquids and gases is assured with the Niagara Aero heat exchanger described in this leaflet. Lower cooling costs, more convenient and dependable cooling, and the assurance of maximum production and highest work quality result from use of this unusual temperature control equipment. Niagara Blower

For free copy circle No. 25 on postcard.

New packing method

A 4-page folder gives complete, illustrated description of a new method of packing articles or packages of different shapes and sizes. The method uses adjustable fiber board sections telescoped together to form an outer container. Shows size chart and simple equipment recommended for complete packing operation using Adjusta-Pak. Signode Steel Strapping Co.

For free cupy circle No. 26 on postcard.

FOR MORE LITERATURE Many companies offer free literature and other information in their advertisements. For the names of these firms see the company listings in the index of advertisers.

Magnetic amplifiers

Technical aspects of Magamp magnetic amplifiers for control applications are discussed in a 20-page booklet. Basic theory underlying magnetic amplifier operation, necessary for application, and a description of operating characteristics are included. Sections of booklet 52-600 deal with component parts, applications, and operating characteristics. Westinghouse Electric Corp.

For free copy circle No. 27 on postcard.

Hydroforming

Range of Hydroforming operations has again been extended with new and smaller (8 in.) equipment. High quality deep-drawn parts may now be produced from 8, 12, 19, 23, 26 and 32 in. blanks. The Cincinnati Milling Machine Co.

For free copy circle No. 28 on postcard.

Titanium tubing

Two grades of titanium tubing and pipe are described in a new product bulletin. Advantages are listed and detailed applications are given. Physical properties, together with data on corrosion resistance, machining characteristics, forming, welding, heat treating and cleaning are included. Alloy Tube Div. of The Carpenter Steel Co. For free copy circle No. 29 on postcard.

Profile grinder

The Union No. 3 tangent-arc profile grinder is covered in this new booklet. The profile grinder is described and shown. Important features are pointed out. The radius grinding, clearing and machine capacity are given. Additional equipment is shown and described. Complete specifications are included. Union Twist Drill Co.

For free copy circle No. 38 on pastcard.



Which hubcap would you reject?





MCA's RareMeT Compound minimizes surface defects

Deep drawing steels, extensively used in automobile production, are often rejected because of surface defects which, in turn, cause low yields. Only the best quality can withstand deep drawing operations and at the same time give high yields.

Our wide experience in numerous plants throughout the country has proven that small additions of RareMeT Compound to the ladle, aid in the manufacture of these steels by increasing hot workability.

If increasing demands for better quality, through improved surface, play a part in your operations as a producer, the economical use of MCA RareMeT Compound is strongly advised. A letter addressed to the nearest MCA office listed below will bring prompt and confidential response.



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Industrial castings

Absco metal castings for industry are described in a new 8-page folder. Five engineering types of Absco metal and several types for heatresistance and wear resistance are available. Booklet describes characteristics and properties of the material and carries engineering information on hardenability, section strength, and comparative properties of other cast metals. American Brake Shoe Co.

For free copy circle No. 31 on postcard, p. 121.

Fabricating aluminum bus

Availability, properties, advantages and methods of joining and bending aluminum electrical bus conductors are detailed in a new brochure. The 12-page publication prepared to assist manufacturers, utilities, architects and engineers in converting to aluminum bus, covers rectangular bar, tubular conductor and solid round bar. Kaiser Aluminum & Chemical Corp.

Heavy industry

Vital equipment for heavy industry—steel, oil, foundry, power, gas—are described in the interesting book of an English equipment builder. It presents a picture tour of the shops and products of a company with more than 150 years experience in industry. Newton Chambers & Co., Ltd.

For free copy circle No. 33 on postcard, p. 121.

Welding

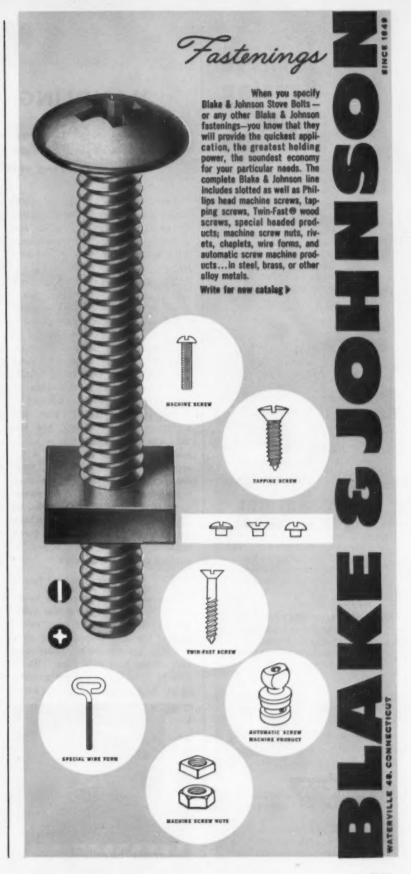
A new 54-page catalog describes a variety of welding machines, automation machines and unusual machine tools. Some of the special machine tools illustrated include vertical boring and drilling and tapping machines. Expert Welding Machine Co.

For free copy circle No. 34 on postcard, p. 121.

Filter Clarifier

This revised 4-page bulletin, No. 30-C, covers the Hardinge line of circular sand filter-clarifiers. The mechanism consists essentially of a spiral rotating scraper suspended at the tank center, which takes a cut from the surface of the sand bed when the filter rate decreases. Hardinge Co., Inc.

For free copy circle No. 56 on postcard, p. 121.



furnace brazing of stainless steel

- Fully Automatic—no operating personnel required.
- High Purity—completely oxygen-free.
- Safe—NO explosion hazard.
- Economical—30%, cheaper than dissociated ammonia.



nitroneal gas generator

... produces pure nitrogen with a controllable hydrogen content that can be varied to meet changing requirements and maintained at any desired percentage between .25% and 25%. This flexibility permits the use of proper gas for any material or process at lowest cost.

Applications include bright annealing, heat treating and furnace brazing of stainless steel, low and high carbon steels and non-ferrous metals.



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HANDLING: Split Fork Loads

Simple metal stampings have helped cut costs in handling of split loads of sheet type stock on fork trucks . . . Method retains economy of full load handling . . . Unload faster.

Large 3000 lb bundles of sheet materials can now be steel strapped in economical large bundles and still be easily handled by customers with lower than 3000 lb capacity equipment.

Because Masonite's big fork trucks at its Laurel, Miss., plant could handle 3000-lb steel-strapped bundles of hardboard economically, units of this size were shipped to customers who could handle them. However, because few customers had fork trucks that could handle such heavy loads, a new idea of steel shop bundling was devised.

The original bundle size was maintained for economy, but the unit was divided into two or three sections by 1 in. x 4 in. x 4 in. separators before bundling with steel strapping. The 1 in. opening between units would not accommodate the forks of the lift trucks, so Masonite developed a plate which would permit entry of the forks without damaging the edges or surface of the hardboards.

Restrap Partial Loads

Now all the customer has to do is cut the steel strapping that holds the bundle, insert the easy entry plates, top and bottom, and ease the lift truck's forks under one unit of the load at a time. He is able to unload faster with greater safety to workers, and to spot loads



Separate bundle . . .

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 121. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

quickly. Often partial loads are restrapped immediately for protective storage, or as a pilferproof bundle to be delivered to retail yards or to construction jobs.

Do It Yourself

The easy entry plates can be made in your own shop, or by a local sheetmetal shop at low cost. The tensional steel strapping, seals, strapping tools and equipment used by Masonite were obtained from Signode Steel Strapping Co., Chicago.

Bearings:

Single row ball bearings used on auto rear wheels.

Among the latest new applications of ball bearings is use of the single row type in the rear wheels of the 1955 Chevrolet. This bearing, produced by General Motor's New Departure Div. at Sandusky, Ohio, carries all the wheel loads in any direction.

The wheel mounting has only one seal situated within the precision rings of the bearing. Placing the seal in the bearing where there is perfect concentricity and optimum finish on the sealing surfaces provides maximum seal efficiency. Any possibility of damaging the seal when the shaft is inserted in the housing has been practically eliminated.

TECHNICAL BRIEFS

A simple O ring in a groove in the outer ring completes the closure. Thus, rear end lubricant is effectively sealed in the axle housing where it belongs. The differential lubricant provides adequate lubrication for the bearing and seal.

Installation of this bearing results in economies by eliminating unnecessary seals, machining of surfaces and handling operations. Servicing is also enhanced because removal of the axle shaft is now a simple matter.

Machining:

Modern equipment speeds crankshaft output.

Fifty-five crankshafts per hour, one of the highest production rates attained, has been made possible with a new automatic unit. The automated crank turning equipment, developed by the R. K. LeBlond Machine Tool Co., Cincinnati, turns and faces precisioncast V-8 crankshafts. One operator can handle two units.

In the early days of automobile manufacturing—about 1906—250 crankshafts could be turned in 18 hours by 23 machines and 23 operators in 4000 sq ft of floor space. By 1929, it took three machines and two operators in 600 sq ft to turn 250 cranks in 18 hours. Today, the same number of crankshafts are turned out in 4½ hours by the new equipment with one-half the time of a single operator.

Equipment In Setup

The new automated setup consists of three pieces of equipment. A LeBlond LBA automatic line bearing center-drive lathe turns all five main bearings, flange and pilot, sprocket diameter and front end simultaneously.

The crank is then automatically transferred to a Sheffield gaging machine where the diameters of the No. 1, 3 and 5 main bearings and the thrust wall width of the No. 3 main bearing are automatically gaged.

The crankshaft is then trans-



GERMANIUM RECTIFIERS PERFORM WITH TOP EFFICIENCY

Udylite Tests Reveal Amazing Current Conversion Efficiency

This air cooled germanium cell with a rectifying surface the size of a dime will handle a 250 ampere load in a three phase circuit continuously and three years of tests show no detectable power losses. Including heat-radiating fins, it takes up just 8 cubic inches of space and weighs only 12 ounces.

Udylite in cooperation with the General Electric Company, now proudly introduces its new group of germanium rectifiers. Years of research and testing have proven that no other metal known offers the high efficiency of germanium as a rectifier material.

In operations calling for medium to high voltages, such as barrel plating, anodizing or chrome plating the efficiency of germanium soon pays the cost since the efficiency of a 3-phase germanium cell is 98 to 99 percent.

Even at high loading germanium has less than one-volt drop in the forward direction. As for reverse current, germanium is again particularly good, having a reverse-to-forward resistance ratio of 400,000 to 1. Furthermore, Udylite germanium rectifiers require little maintenance and can be located in areas of minimum ventilation.

For further information regarding germanium rectifiers—prices, deliveries and specifications—consult your Udylite representative or write today direct to:



WORLD'S LARGEST PLATING SUPPLIER



Licensed manufacturers of recessed head screws who have specified "Special Processed" wire for their difficult cold heading jobs find that it more than pays for itself by: (1) increasing the production rate which lowers the cost per unit; (2) greatly prolong die life which reduces machine down-time and labor costs; (3) providing a higher quality finished product which minimizes rejections and inspections.

The excellent flow properties of this superior cold heading wire, together with its structural soundness, enables you to gain greater efficiency from start to finish on the more intricate and precise cold heading parts in your production schedule.

For further information, see your Keystone representative or write direct.



ferred by customer's automation to the LeBlond PBA automatic two-spindle pin turning machine. Here all pin bearings of two crankshafts are turned simultaneously. From here the cranks are delivered into the customer's automation for further machining.

Shell Molded Castings

A production rate of fifty-five crankshafts per hour, including allowances for time to change tools and make machine adjustments, was made possible by the precision shell molding technique by which crankshafts are cast to very close tolerances.

All machine motions are electrically and hydraulically sequenced for continuous automatic operation. A console-type pushbutton operating station includes indicating lights to signal certain conditions throughout the cycle. Manual control of most of the functions is provided for set up, tool change, repair or adjustment.

Centered, Milled, First

Before reaching the turning equipment, the crankshafts are prepared by centering and milling the ends and locating spots on three lobes.

The crank is then picked up by the automatic loader hooks of the line bearing machine and delivered to the chuck. At the same time, the turned crank has been picked up and placed on the vee blocks of the gaging unit.

Centers are inserted hydraulically into the rough crank, positioning being accomplished by the left hand center which moves in faster than the right hand.

Checked for Size

In the meantime, the gaging machine has checked the turned



Crankshaft turning setup..



Get Production, Economy, Quality with J&L Cold Heading Wire

More and more profit-conscious wire users are turning to J&L for Cold Heading Wire that helps them get increased production, top quality and operating economy. They've found that J&L furnishes wire with—

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 The Utmost Uniformity
- ... in other words cold heading wire that consistently

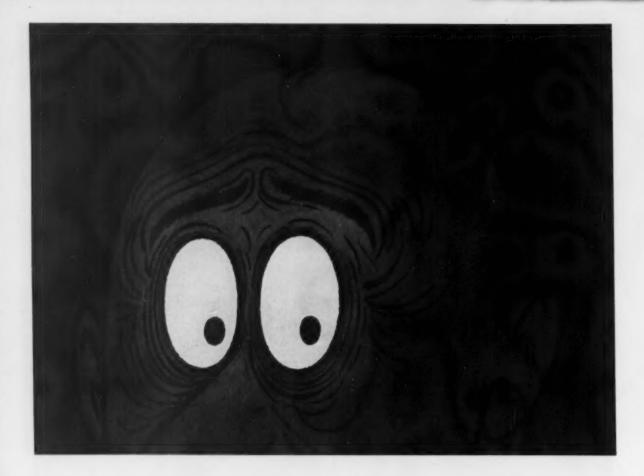
has the right chemical and physical properties.

The dependability of J&L Cold Heading Wire is the result of quality control from ore to finished product, rigid testing, modern equipment and over a hundred years of iron and steel-making experience.

Contact J&L and investigate the economies of using J&L Cold Heading Wire in your operation. Remember, it's tops in quality—competitive in price.

Jones & Laughlin

STEEL CORPORATION - Pittsburgh



In the dark about hidden costs?

Call your Kaiser Aluminum Distributor!

By drawing on his large stocks, you can reduce your raw material outlay, cut your handling and insurance costs. This will also reduce unproductive storage space and convert it into space that lets you do more profitable jobs.

Your Kaiser Aluminum Distributor has had plenty of experience serving firms like yours. He stocks a wide variety of aluminum and can provide you with almost any size, shape or alloy—slit, sawed or sheared to your needs.

He's geared to meet your emergency needs, to go to work the minute you call. And, if you want to borrow on his experience, he can also specify the exact type of aluminum your product requires. He can suggest methods of using aluminum more economically. He can supply you with small quantities for experimental work.

All these services mean more profits for you because they help lower your costs. Why not call your Kaiser Aluminum Distributor today?

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KANSAS CITY, Me., Baltimere 7760
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4.05 ANGELES, Calif.
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Earle M. Jorgensen Co., Lorain 7-1122
Reliance Steel Company, Adams 3-3193
MIAMI, Pla., Phone 84-3165, 84-2490
Fulletton Metals Co.
1045 Northwest 71st 51.
MILWAUKEE, Wis., Evergreen 4-6000

MILWAUKEE, Wis., Evergreen 4-6000 Korhumal Steel & Aluminum Corp. of Wisconsin

of Wisconsin
MINNEAPOLIS, Minn., Geneva 2661
Korhumel Steel & Aluminum Company
NEW ORLEANS, La.
Orleans Steel Products Co., Inc.,
Raymond 2116
Standard Brass & Mfg. Co., Auburn 1381
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Y. E. Conklin Brass & Copper Co., Inc.,
Walter 5-7500
A. R. Purdy Co., Inc.,
Lyndhurst: Webster 9-8100
Now York: Chelsea 3-6455
Newark: Humboldt 2-5566
OAKLAND, Colif.

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American Brass & Copper Co., Higute 4-2366
Gilmore Steel & Supply Company
Glencourt 1-1680
Earle M. Jorgenson Co., Higute 4-2030
OMAHA, Nebr., Atlantic 1830
Gete City Steel Works

PHILADELPHIA, Penna., Delaware 6-5400 Hill-Chase & Company, Inc. Allantown: Hemlock 2-8077 York: York 5790

PHOENIX, Ariz., Phone 8-5331 Arizona Hardware Co., Inc. Arizone Haraware Co., Inc.
PITTSBURGH, Penne., Hemlock 1-5803
Follansbee Metal Warehouses
PORT ARTHUR, Tex., Phone 5-9377
Standard Brass & Mfg. Co.
PORTLAND, Ore., Tuxedo 5201
Eagle Metals Inc. of Oregon

SAN FRANCISCO, Culif., Klondike 2-8511 Gilmore Steel & Supply Company SEATTLE, Wesh., Lander 9974 Eagle Matals Company

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WORCESTER, Mass., Worcester 7-4521 Merrill Aluminum Corporation

TECHNICAL BRIEFS

Acceptable parts are automatically ejected and the all-clear signal given . . .

crank. If acceptable, it ejects to rear automation and signals "all clear." If not acceptable, the crank remains in gage and a red light on the panel indicates the faulty portion; functioning of the LBA is held up at this point.

Gage Cleared Manually

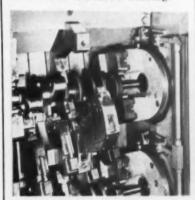
When adjustments are made, the gage is cleared manually and machine started again.

Rough and finish tool blocks, traverse, feed, dwell and retract from front and rear simultaneously. The machine jogs to a stop with lock pin determining correct rotational position. The crank is then automatically unchucked, centers are withdrawn and loader hooks pick up.

Main Bearings Turned

Cranks with main bearings turned and checked by the gaging unit are delivered to pick up station of the two-spindle pin turning machine. Two cranks are picked up by the PBA automatic loader hooks and delivered to chucks while two finished cranks are obtained from chucks and placed in outgoing automation.

Main bearings are engaged by the chucks which drive by three milled spots on the crank lobes. Cranks are positioned end-wise by ball bearing rollers contacting the sides of the thrust bearing.



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Quality Gears for over 60 years



Sawing:

Telescoping leg adjusts band saw table.

By attaching a telescoping leg to a bandsaw table Temco Aircraft Corp., Dallas, Texas, saves 11/2 manhours per day on each machine. The leg was developed for cutting out form block sections out of aluminum, steel and other form block materials.

Adjust Angles

By extending or contracting the adjustable leg, an operator can make cutting angle changes while the saw is in motion. This is particularly valuable in sawing variable contours.

The operator formerly had to stop the saw to make a change in the cutting angle. This produced an irregular contour with a notch marking every spot where the cutting angle was changed. Notches then had to be removed with a router.

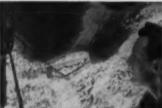
It was possible to cut variable contours with the bandsaw, but it was a three-man operation. The operator actuated the saw blade and guided the material. One assistant called out degree changes, using a level and protractor, and a third man supported the table and moved it from one position to another.

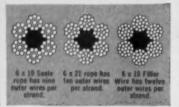
Before the degree-changer was



One man operation . . .







What can you do better with 6x21 Red-Strand wire rope?

What is 6 x 21 wire rope? It is sometimes called 6 x 16 Filler Wire. It is a construction of intermediate flexibility-between coarse 6 x 19 Seale and flexible 6 x 19 Filler Wire. 6 x 21 is a good choice where the operation includes abrasion and at the same time the rope is subjected to considerable bending. On certain types of duty the choice is vital to save time, effort and money.

When to use it? If, for example, your 6 x 19 Filler Wire rope is wearing out too soon because of abrasion, 6 x 21 with larger outer wires may provide much longer life. If severe bending is damaging your 6 x 19 Seale, a change to more flexible 6 x 21 may be profitable.

It is used on certain dragline jobs, vertical shaft hoists, drag and slackline scrapers, inclines, rotary and cable tool drilling rigs, and other equipment.

Can you use it to advantage? The best answer to that question comes from your Leschen technical man. Leschen representatives will help you get the most out of your wire rope. And with Hercules Red-Strand-as with all other Leschen wire rope, you are assured of higher-than-rated quality for longer-than-expected service.

See your Leschen man soon. He can easily be reached through your nearby Leschen distributor.

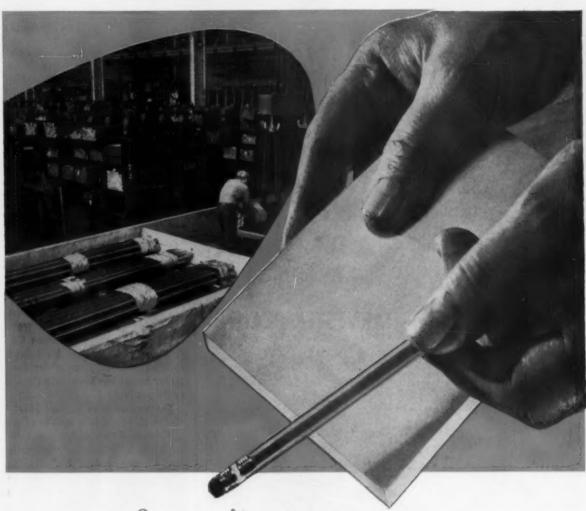
> Depend on Leschen's higher-than-rated quality for longer-than-expected service.



St. Louis 12, Missouri







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TECHNICAL BRIEFS

installed, a friction lock had to be loosened while the table was adjusted by hand. Now, the friction lock remains in one position, tight enough to take some table weight off the new leg, but not so tight that the table won't move when the leg is telescoped.

The leg consists of a length of threaded drill rod which fits inside a sleeve made of 1\(\frac{1}{4}\)-in. tubing. Dowell pins secure the leg to the base and to the table of the saw.

Welding:

Large continuous welder installed at plant.

One of the world's largest continuous welders is now at work for The Morgan Engineering Co., Alliance, Ohio. Costs have been reduced and the time of welding girder seams has been cut as much as 94 pct.

The welder with a track length of 110 ft can obtain speeds of up to 120 ipm. The unit has two welding heads that float both vertically and along the ram horizontally. Welding heads will trace curves and follow a change in direction around a girder flange, allowing two seams of a girder to be welded at one time.

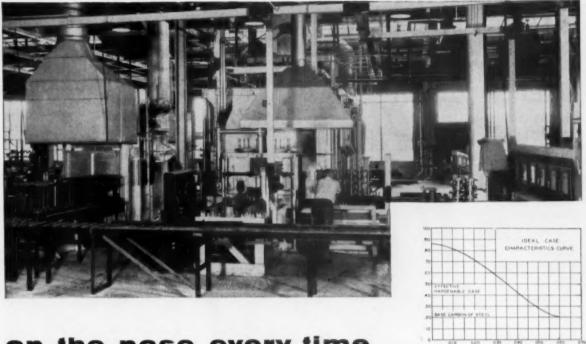
Improves Weld Quality

The welder can weld both girth seams of hoisting drums at one time. Hobart constant voltage motor generators are used to give complete operation control.

The welder, designed and developed by the Morton Mfg. Co. of Muskegon, Mich., and Morgan, is

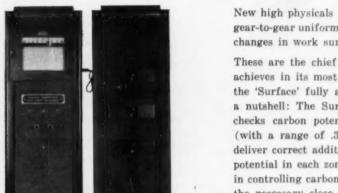


Large continuous welder . .



on the nose every time

WITH SURFACE AUTOCARB AUTOMATIC CARBON POTENTIAL CONTROL



New high physicals in carburized gears-better tooth-to-tooth and gear-to-gear uniformity-faster cycles-automatic compensation for changes in work surface area during furnace operation . . .

These are the chief benefits Warner Gear Division, Muncie, Ind., achieves in its most recent continuous gas carburizing line, using the 'Surface' fully automatic carbon potential control system. In a nutshell: The Surface dewpoint recorder-controller periodically checks carbon potential in each of three zones in the furnace (with a range of .3 to 1.1% carbon), controls mixing valves to deliver correct additions of air or gas to maintain desired carbon potential in each zone. This system eliminates the human element in controlling carbon potential. It also provides Warner Gear with the necessary close control required for the practical carburizing of gears with near-eutectoid surface carbon concentrations.

Write for Literature H-54-2.



SURFACE COMBUSTION CORPORATION TOLEDO 1, OHIO

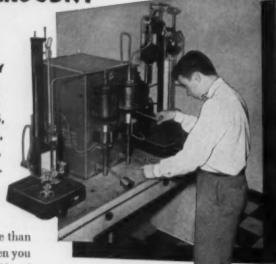
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Plant area covers more than ½ million sq ft . . .

unique. It enables Morgan to eliminate variables found in manual welding operations and increases the strength of welds by using the submerged-arc method giving complete penetration.

Facilities Large

Morgan makes cranes and heavy equipment. It operates in a ½ million sq ft plant area housing structural, weld, pattern, erection, forge, and machine shops. Morgan can fabricate structurals and weldments up to 200,000 lb.

The company has machining facilities for equipment of all sizes and shapes, accommodating sizes and shapes up to 200 in. x 21 ft x 9 ft high and 144 in. x 30 ft x 10 ft high. The massive erection floor (600 x 100 ft) with crane capacities up to 100 tons can handle the heaviest of assemblies.

Processing:

Molecular sieves of improved structure developed.

Two selective adsorbents, recently developed provide industry with a completely new basis for the separation and purification of mixtures of gases or liquids. Called molecular sieves, these new materials are man-made crystalline zeolites developed by Linde Air Products Co., a Division of Union Carbide and Carbon Corp., New York.

Unique feature of these new adsorbents is that they can separate mixtures of gases or liquids on the basis of the difference in molecule size. Heretofore, difference in boiling point has been the primary factor in selective adsorption.

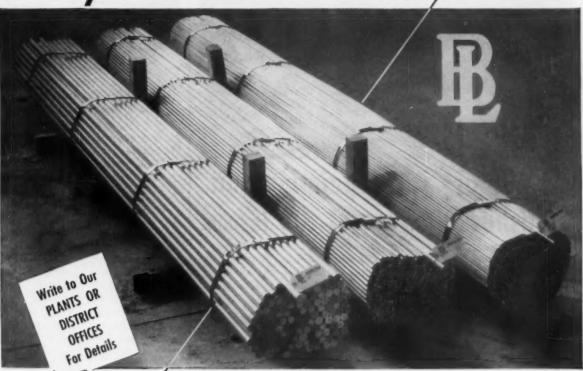
Crystals Do Not Collapse

During manufacture, man-made zeolite crystals are heated to drive out the water of hydration. Because of the unique nature of the molecular sieve crystals, they do not collapse as other zeolites do.

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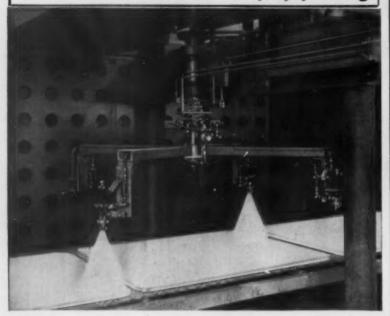


DETROIT, MICH.





WHAT'S NEW in automatic spray painting



New rotary spray painting unit finishes flatware at 100 ft./min.

This new automatic rotary spray painting machine has three major advantages over previous automatic equipment: (1) It applies uniform coatings at extremely high conveyor speeds. Outstanding results have been obtained with the conveyor running as fast as 100 feet per minute. (2) Close synchronization of the rotating speed to the conveyor speed is made possible with the precise built-in variable speed drive. (3) Maintenance is greatly reduced. There are fewer moving parts in the new rotary machine and they travel continuously in one direction at low speeds, reducing vibration, wear.

Overspray reduced to minimum

The spray guns operate only when they are directly over the product. Each turns on automatically when

it reaches the edge of the product and shuts off as it leaves. The length of time the guns are in operation can be changed while the machine is operating.

Other special automatic units

In addition to the Rotary Unit, Binks offers the Automatic Reciprocating Machine and the Automatic Spindle Machine. Virtually any product can be finished automatically with one of these three machines.

For further information

If you are interested in automatic finishing, Binks will gladly analyze your operation and make a specific recommendation. There is absolutely no obligation. Just write to the address below:









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Molecular sieve model . . .

Instead there remains a porous crystal structure containing millions of cavities interconnected by a series of pores of extremely uniform size.

Since adsorption takes place on the interior surface of the cavities, only those molecules small enough to pass through the pores can be

Molecular sieves are expected to find widespread use throughout industry. For example, in the drying of gases, a common industrial process, they can improve the efficiency of the operation because of their tenacity for water vapor, their high capacity, and their high rate of adsorption. These properties can result in more thorough drying, and also make it possible to use smaller, less expensive equipment.

Solve Separation Problems

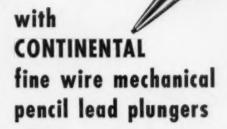
Another potentially large field of application is the drying and purification of liquids. It is extremely difficult and sometimes impossible, to separate by distillation, two materials with approximately identical boiling points.

But as long as one of the materials is small enough to pass through the pores of one of the molecular sieves, it can be adsorbed. In this manner, such a separation becomes relatively simple. Molecular sieves can also be used for the simultaneous adsorption of other impurities along with water if this is desirable.

There are several possible static

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Gets the Lead Out



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Strong affinity for polar and unsaturated molecules could prove aid in gas, water purification . . .

type applications for which molecular sieves are well suited. One of these is as static desiccants in the packaging of materials subject to damage from rust or mildew.

In addition to their selectivity based on size, molecular sieves show a marked affinity for both polar and unsaturated molecules. This affinity is so marked, that they will adsorb polar or unsaturated molecules in preference to saturated or non-polar molecules of the same size.

This feature could find application in the purification of gases and liquids, and in the reclamation of useful constituents of industrial waste gas streams.

Other useful features of these

new adsorbents are their high adsorptive capacity at elevated temperatures and their high capacity even when the material to be adsorbed is present only in extremely low concentrations. For example, molecular sieves will adsorb water at temperatures as high as 212° F.

As a result, they can dry gases at this temperature, making it unnecessary to pass the gas first through a series of cooling cycles. Also, because of their strong affinity for water, they can superdry gases to dew points below —100 deg. Fahrenheit.

Two other fields of application now undergoing investigation are catalysis and ion exchange. Tests indicate that molecular sieves have a higher ion exchange capacity than many zeolites and ion exchange resins now in commercial use.

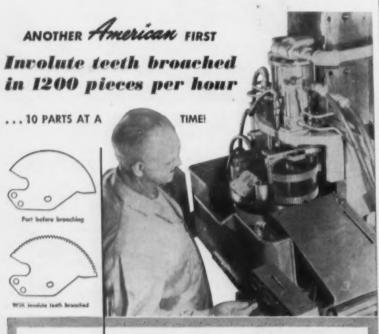
Regeneration Easy

Of special interest is the fact that these new adsorbents can be readily regenerated by a combination of heating and purging. This means that they can be used over and over again. This is particularly important if they are to be used in continuous cyclic processes where the cost of replacing the adsorbent after each adsorption cycle would make its use prohibitive.

Molecular sieves are presently being manufactured in two pore sizes: Types 4A and 5A, 4 Angstroms (16 billionths of an inch) and 5 Angstroms (20 billionths of an inch) in diameter respectively. Both sizes are offered in powder form and in 1/8 and 1/16 in. pelleted forms.



Checking adsorptivity . . .



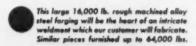
An indexing fixture, equipped with two loading stations and automatic clamping, is mounted on an American 3-way machine to perform this specialized high production broaching operation. While one station is broaching, the operator stacks 10 parts at the other station. The stack is automatically indexed into broaching position and then clamped. At end of the broaching stroke, the stack is indexed and discharged into a chute by an automatic air ejection unit.

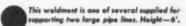
The low piece cost obtained on this machine, is an example of the economies that American gives you — by supplying a machine completely tooled with work-holding fixtures and broaches.

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Plants at Titusville, Pa. and Warren, Pa. Offices in Principal Cities

Electronics:

Electronic meter checks quality of adhesive bonds.

Adhesive bonded materials can now be tested for quality without destroying the bond.

An electronic meter that indicates the quality of an adhesive bond by the mechanical impedance method is now in use at the Fort Worth plant of Convair, a division of General Dynamics Corp. First work on a mechanical impedance method was done at Stanford Research Institute, Stanford, Calif. The work on this research program resulted in an electronic instrument that determines the quality of a bond by a comparison of amplitude responses.

Convair's test engineers became interested in the instrument because of development work on honeycomb-sandwich-type construction which requires that the fiber glass honeycomb core and alumi-

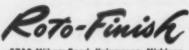


Testing for bond . . .



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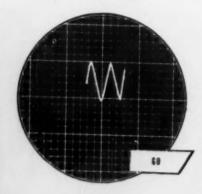


3712 Mi ham Road, Kalamazoe, Michigan Originators of the Roto-Finish Process



COMPANY

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Typical patterns . . .

Inspector first spreads film of oil on panel to be tested . . . A ceramic crystal, excited by a high-frequency oscillator, is then run over the panel surface . . .

num attaching slugs be bonded between two aluminum sheets with adhesive materials.

The test engineers developed a modified meter based on the findings of Stanford Institute. They dubbed it the "STUB" Meter, or more specifically, Stanford Testing Ultrasonic Bond meter. With the STUB Meter and a minimum amount of training, an inspector in the metal-bonding section performs a go or no go type inspection.

Vibrate Specimen

To use the STUB Meter, the inspector spreads a film of oil on the panel to be tested. He then runs a ceramic crystal over the surface of the panel. The crystal is excited by means of a high-frequency oscillator at a resonant frequency of 400,000 cycles per second. The test specimen vibrates at the frequency of the crystal.

The degree or amplitude of vibration is affected by the bonded joint. The better the bond, the less vibration. The crystal has special electrical properties which permit it to receive as well as transmit electrical energy. The electrical signal is returned to the meter and the inspector views the amplitude response on an oscilloscope.

Reinspect Rejects

He knows when the amplitude response, or wave form, stays inside the known grids on the face of the oscilloscope, he has a good bond and he passes the panel. If the panel doesn't pass, the inspector sends it to the test lab for analysis by STUB Meter Two.

This meter operates on the same principle as STUB Meter One, but the wave form on the oscilloscope requires more interpretation.

Convair's test lab engineers developed STUB Meter Two so that they can tell the cause of defective bonds. Different wave forms on the scope indicate different types of defects.

STUB Meter Two thus serves as

a reviewing board for panels not passed by the bonding inspector using STUB Meter One. Faults in bonding result from low temperature in the curing process, contaminated panels that were not properly cleaned before bonding, low pressure in the bonding proc-

ess, or the presence of voids.

These two STUB Meters give
Convair's quality control department an accurate non-destructive
method of inspecting bonded panels.
Use of the meters insures that only
good panels are passed for assembly.

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Plate rolls—bending rolls—back up rolls—straightening rolls—table rollers and other mill rolls are dependably forged and ground in any size—to any specification at Titusville Forge. Illustrated above is a straightening roll being ground on our 42" Landis Grinder. Size is 16" diameter x 28'3\%" long, 40/45 scleriscope hardness.

Rely on Titusville Forge for mill rolls that meet your specific requirements.



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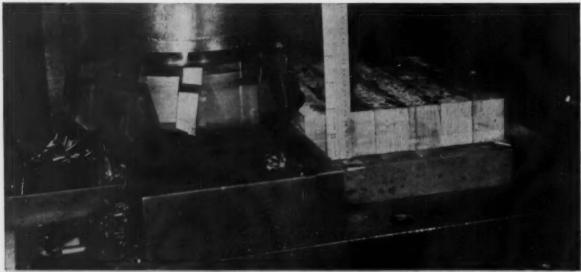
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O INCREASE PRODUCTION & GIVE UP TO 50% LONGER LIFE





DETAILS OF JOB ILLUSTRATED

READY FOR YOU

Complete Technical and Shop Data on the Carmet "CA-600 Series" of special steel-cutting Carbides

White for Your Copy

ADDRESS DEPT. A-631

Here's something special for you: the new Carmet steel-cutting grades of carbide, called the "CA-600 Series." One of the grades is shown above in a milling operation—a tough job where the major requirement was continuous production. Cutters equipped with Carmet CA-610 inserts not only increased the production of the machine on this job, but actually gave 50% longer life than the comparable cutting materials previously used.

These heavy-duty CA-600 Carmet grades (premium products in performance, at no premium in price) have been thoroughly job-proved in the field. They're available to fit your steel-cutting requirements . . . let us arrange a demonstration of their ability to save time and money for you. Get in touch with your nearest A-L representative or distributor, or address Allegheny Ludlum Steel Corporation, Carmet Division, Detroit 20, Michigan.

For complete MODERN Tooling, call Allegheny Ludlum



N E W E Q U I P M E N T New and improved production ideas, equipment, services and methods described here offer production economies...for more data use the free postcard on page 121 or 122



Probes from 0.05 in. to 125 ft into metal

New UW Reflectoscope is equipped with nine frequency ranges, between 200 kc and 25 mc, and both aural and visual signals. Designed for production ultrasonic inspection, either contact or immersed, the instrument incorporates pulse rate variable from 60 to 1000 pulses per sec. Higher repetition rate provides greater brilliance and faster automatic scanning speeds.

The UW unit is capable of testing through 125 ft of material and for finding tiny invisible defects as close as 0.05 in. to the surface. Illustration shows the UW with Simac-Westinghouse immersed inspection tank and recorder. It is used for manual and semi-automatic inspection of wheel-shaped jet engine forgings. Sperry Products, Inc.

For more data circle No. 35 on postcard, p. 121.

New form grinders for working on gears, splines

New 30 in. internal and 36-in. external gear grinding machines are automatic form grinding machines for working on gears, splines, and specially contoured parts. Typical parts produced are helicopter ring gears, gas turbine compressor drive shafts, locomotive drive gears. Ease and speed

of re-tooling for another job contributes to the versatility of the machines. On both machines the grinding wheel carriage speed. equipped with 6-in. face widths, will make 55 cuts per min. Both machines have hollow workhead spindle. Gear Grinding Machine Co.



Permits controlled cold working of welds



The adjustable low to high pressure available in a new automatic weld area planishing roll provides controlled cold working of the weld and heat affected zone. Welds on steel, titanium, aluminum and all other metals can be rolled and fusion welds can be smoothed. The planishing roll helps reduce grinding operations and assist spin-

ning, bulge forming and sizing operations. It is said to increase physical properties and to refine grain of weld and adjacent areas. Welds on flat sheets, cylinders and cones can be rolled with workpieces ranging in size from 1¾ in. to 10 ft diam and to 10 ft long. Airplane Welding & Engineering.

For more data circle No. 37 on postcard, p. 121.

Accurate electronic gaging of small parts

A relatively inexpensive new type of special electronic gaging device employs a regular gage head cartridge. This application offers possibilities for much usage in plants where small parts are accurately gaged in quantity. The cartridge is set at an angle for increased visibility with a resultant increase

in the speed with which small parts can be inspected. The cartridge can be positioned quickly for measurements over a 2-in range. The anvil, which is threaded into the base, has a range of $\frac{3}{4}$ in. Brown & Sharpe Mfg. Co.

For more data circle No. 38 on postcard, p. 121. Turn Page

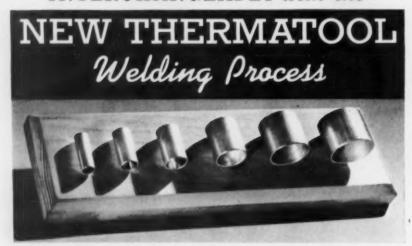


For the First Time

TUBING MADE FROM



ALUMINUM, BRASS, STEEL STRIP
IN ANY DIAMETER
INTERCHANGEABLY with the



Pat. Fending

If you use or make tubing in any form, you owe it to yourself to investigate this far-reaching development in tube welding which permits the manufacture of all kinds of tubing from strip, even with copper with 100% conductivity, on a continuous basis at great savings in time and money. No change in the weld head is required to change diameters or type of metal!



EXCELLENT DRAWING QUALITIES

The above samples of 1¼ inch aluminum tubing made by the Thermatool Method and drawn in steps down to ¾ inch with no effect on the weld, is graphic evidence of another reason why engineers, tube mill manufacturers, and producers are placing orders for one of the most important basic developments in tubing in years. Send for details of the Thermatool Method of tube welding today.

ested in high frequency heating in any form, send for this interesting booklet which explains many other facets of Induction and Dielectric Heating including the use of motor generators and vacuum tube units of all capacities and sizes made and sold by New Rochelle Tool Corp.

NEW ROCHELLE TOOL CORPORATION

320 MAIN STREET . NE. 2-5555 . NEW ROCHELLE, N. Y.

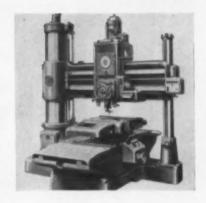
ENGINEERING • DEVELOPMENT • MANUFACTURING • MARKETING
OF INDUCTION, DIELECTRIC AND ELECTRIC HEATING EQUIPMENT

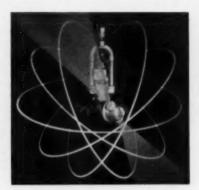
Jig borer permits fast, accurate work setup

Positioning a workpiece to within 0.000125 in. takes only a few seconds on the Kolb jig borer. It's fast because of rapid traverse with adjustable stops, and accurate because of a Leitz optical system with magnification of 1:100. Convenient pushbutton control permits preselection of 18 feeds and 36 speeds. Electro-hydraulic clamping is shock-free and distortion-free; does not impair accuracy. Reading

accuracy equals positioning accuracy. Signal lights indicate if head and table are clamped or unclamped. A machine built for drilling, boring, reaming, tapping and milling as well as precision measuring. Working surface of table 69 x 39 in., clearance between columns 73 in., maximum distance between spindle and table 40 in. Cosa Corp.

For more data circle No. 39 on postcard, p. 121.





Tank cleaner combines rotation and scrubbing

Three-dimensional rotation of a high pressure hydraulic jet is provided by a new tank cleaner, the Rotor Jet. This compact, lightweight device delivers two powerful streams of hot or cold water, with or without detergents, over the entire inside surface of any shaped tank. One man can handle the entire tank cleaning operation without assistance. The Rotor Jet is lowered through the tank access

by its supply hose and is controlled from outside. There is no need for workmen to enter the tank. Cleaning speeds are fully adjustable. Two jets, powered by a venturinjector, provide high velocity streams so that a scrubbing rather than cascading action results. Three models for discharge capacities from 600 to 6000 gph are available. Sellers Injector Corp.

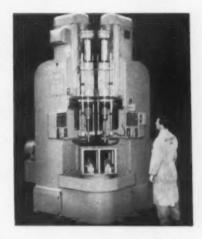
For more data circle No. 40 on postcard, p. 121.

Double-spindle Hydrohoner offers speed and precision

Design of a double-spindle vertical Hydrohoner incorporates two basic units with separated columns for each spindle. The machine is equipped with Microdial automatic abrasive feedout and stonewear compensation, and Microsize automatic sizing control. It has automatic coolant start and stop and automatic time cycle. A 3-speed transmission assembly controls rotation on each unit. Reciprocation is hydraulically actuated, and speed is infinitely variable from 0 to 60

sfm. To provide automatic indexing and operator safety, automatic rotary index table controls are interlocked with machine controls. The 4-station fixture makes it possible to hone two parts simultaneously while two stations are being unloaded and loaded. The same procedure can be used with onestation indexing to hone the same bore progressively, or two different bores in the same part. Micromatic Hone Corp.

For more data circle No. 41 on postcard, p. 121.



Aircraft special welder has 5-300 amp range

An extremely wide welding range of 5 to 300-amp is a feature of a new electric motor driven dc arc welder. It has a normal rating of 200 amp for average welding work and the added ability to get down to exceptionally low heats for best results in welding very light gage metals such as used in aircraft welding, body and fender work. Model MBT-204 has a special re-

sistance unit connected in the lowest range setting of the main selector switch, to make possible the very low welding heat. This unit is mounted under a special hood on the back of the control cabinet, so as to dissipate its functional heat outside the welder. Hobart Brothers Co.

For more data circle No. 42 on postcard, p. 121.

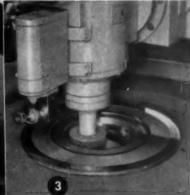
Turn to Page 148



... and you can turn, bore and finish grind a single workpiece to close tolerances on the NEW FRAUENTHAL SERIES 3100 TURNING AND GRINDING MACHINE.

With it, you obtain unusual machining accuracies that assure concentricity of related surfaces.







WITH the new Frauenthal Series 3100 precision turning and grinding machine you get accuracies previously considered impractical.

Designed to meet the most exacting requirements of jet engine manufacture as well as other precision applications, the Series 3100 machine is new from the ground up. Its unique design presents a host of opportunities to put large and extremely close-tolerance jobs on a mass production basis. And the 3100 offers exceptional capacity for precision turning and precision grinding.

Check these salient features

- Ultra-precision work table bearings
- Hydraulically actuated turning slide
- Hydraulically actuated grinding slide
- Super precision grinding spindle
- Conveniently located controls and safety switches

. . . and this optional equipment

- Hydraulic tracer central
- Electronic table surface speed control
- Hydraulic wheel dressers for varied applications

Frauenthal Division

THE KAYDON ENGINEERING CORP.
MUSKEGON, MICHIGAN

... about the pictures

PHOTO 1 shows how the operator uses a Series 3100 machine to finish bore the inside diameters preparatory to grinding operations.

PHOTO 2 shows the machine's contouring attachments being used to face the top surfaces of a workpiece.

PHOTO 3 shows how the machine performs close-tolerance finish grinding of the workpiece's top surfaces and inside diameter, to assure concentricity and squareness of related surfaces,

PHOTO 4 illustrates (a) grinding spindle with graduate swivel mounting, (b) push-button control panel, (c) five-station tool turret, (d) hydraulic actuated turning slide, (e) hydraulic tracer control (optional).

May we help you?

If you'd like further information on how the Series 3100 precision turning and grinding machine can give you production and/or tool room advantages — our engineers are at your service. Write for informative bulletin No. 301.



Cross-Bay*Transfer

Automatic motor-driven transfer cars provide a universal handling system in modern parallel bay plants now served by overhead cranes. Also for transfer between plant buildings.



EASTON CAR & CONSTRUCTION COMPANY - EASTON, PA. - NEW YORK - PHILADELPHIA - PITTSBURGH



Ball-point burnishing tool

A small tool that erases scratches in aluminum sheet is made from a common ball bearing which is secured to a rod for use in an electric or air drill. The revolving



ball is passed over the damaged skin with a light oil as a lubricant. It is stated that this powered burnishing tool does a better job and saves 38 pct of the time needed by hand burnishing methods. Martin Aircraft.

For more data circle No. 43 on postcard, p. 121.

Sealing porous castings

Hydrostatic pressure is employed in a new method of sealing porous castings such as brass, aluminum, cast iron, magnesium and other types of metals. A circulator forces a liquid sealing compound into



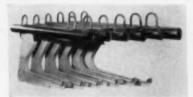
the pores of the metal, the sealing solution being electrically heated and thermostatically controlled to maintain a constant temperature. It is claimed that by the use of the circulator it is possible to salvage castings that would otherwise have to be scrapped. Versnick Mfg. Co.

For more data circle No. 44 on postcard, p. 121.

NEW EQUIPMENT

Monel pickling hooks

Acid-resistant Monel hooks for use in pickling operations are of allwelded construction. These hairpin-type hooks feature a speciallydesigned drip trough on the load



bar that picks up condensate and carries it out beyond the rod bundles. Two types and six sizes are available with load capacities up to 3000 and 6000 lb. Length of load-supporting section varies with size and number of rod bundles. Lewis Welding & Engineering Corp.

For more data circle No. 45 on postcard, p. 121.

Automatic bar feeder

With a new bar feeder, Model 1700 B, bars and tubes can be fed automatically to centerless grinders, polishing machines, heat treating and hardening equipment, etc. This model will convey parts ½ to 1½



in. diam and 6 to 26 in. long at any desired, constant speed of 5 to 20 fpm from the hopper to the machine. Other models are available up to 60 in. length and at various rates of feed. Cycling control of this unit can be photoelectric relay or mercury switch. Feedall, Inc.

For more data circle No. 46 on postcard, p. 121.

Turn Page





for exacting standards only



Not one strip rolling requirement in ten need be carefully "miked" to assure close width tolerance.

But that exceptional job is routine with Somers THIN STRIP. Monel, pure Nickel and Nickel alloys are rolled to within $\pm 5\%$ from .010" to .00075", with the same degree of accuracy in widths, and with the exact properties required by your product.

Modern rolling, annealing and precision control equipment assure uniform high quality under the most rigid specifications.

And Somers 40 years experience in a wide range of applications is available to help solve your strip problem without obligation.

Write for confidential data blank or field engineer.

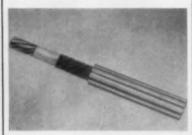


Somers Brass Company, Inc. WATERBURY, CONN.

NEW EQUIPMENT

Fluted welding cable

New, fluted welding cable is long wearing and has great impact resistance. It is light and unusually flexible, easy to grip and cooler to handle since its greater surface



area dissipates heat fast. The cable has fluted jacket of 60 pct natural rubber compound; rayon reinforcing braid; insulation of special natural rubber compound; high-grade insulating paper tape, and conductors. U. S. Rubber Co.

For more data circle No. 47 on postcard, p. 121.

Sprayed foam insulation Fifteen minutes after being sprayed onto a tank model, Poly-

Cell, the foaming insulation, has expanded to a 1-in. thickness. Outstanding advantage of this new insulation is the speed at which



irregular surfaces can be insulated. Poly-Cell eliminates both fitting and fastening tasks; can be installed wherever a spray gun can be pointed. It will adhere to any type of clean, dry surface and equally well to moist surfaces. Any desired thickness can be applied in one coat. After the foaming action, it leaves a normal looking semi-rigid insulation. Insul-Mastic Corp. of America.

For more data circle No. 48 on postcard, p. 121.

Somers UNIGRAIN.

thin strip brass for deep drawing



Fine Grain Finish

Somers Brass Company is pleased to announce the availability of a new, unique annealing process which makes possible a uniform fine grain of less than .010 mm. which can be drawn to full 40% elongation.

Developed in cooperation with the Selas Corp. of America this new process makes it possible to deep draw Somers THIN STRIP and still obtain a fine grain which is easily buffed to a brilliant finish.

And this new Selas Furnace provides high production as well as close control of temper and uniformity. It is typical of the modern equipment with which Somers produces copper, brass and other alloys to rigid specifications between .010" and .00075".

If you have a problem with thin strip, let Somers experience help you. Write for confidential data blank or field engineer.

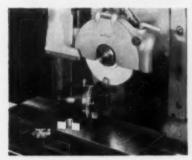


Somers Brass Company, Inc. WATERBURY, CONN.

NEW EQUIPMENT

Double duty tool

Rothfuss G-2 angle dresser and tool holder embodies all elements required for angle truing wheel dressing service, or serves as an efficient, sturdy and accurate tool holder. A graduated easy-to-read



vernier scale can be set to within 5 min of 1° in sec. It is a real time-saver, eliminating guesswork in wheel dressing. As a tool holder it can be set quickly to clearance angle desired. No wrenches needed. Holds tool bits to 1 in, sq. Rothfuss Tool Co.

For more data circle No. 49 on postcard, p. 121.

Tapping attachment

Operating on the SPV weightlesstapping principle, the new 300 tapping attachment does not require any spindle pressure by the machine operator during the tapping operation. Axial floating action assures consistently uniform tapped



holes. Dimensions and forms of the thread produced are solely dependent on the tap itself. The reduction of axial stress on the tap increases its life to 400 pct it is reported. *Tapmatic Corp*.

For more data circle No. 50 on postcard, p. 121.

Turn Page





Free!



NEW 8-PAGE BROCHURE ON SCREW MACHINE SERVICES

This new 8-page brochure on Biddle's facilities shows a small part of the plant that is devoted exclusively to screw machine parts measurements.

If you have immediate needs, your drawings via mail or a call to us will give you an immediate quotation. No obligation, of course.

BIDDLE

SCREW PRODUCTS

SHERIDAN, INDIANA

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ULBRICH Stainless Steels

Immediate Delivery from Stock

STRIP · Flat Wire and other Stainless Steels

a foot or a pound
and up
to your EXACT requirements
from the BIGGEST little Converting Mill in the country.

Complete Inventory

Phone: Wallingford, 9-7771 Wallingford, Conn. Established 1924



NEW EQUIPMENT

Giant metal-forming press

Two 5000-ton self-contained units which can be operated individually or simultaneously comprise this 10,000 ton metal-forming hydraulic press. Of column type design, each of the units is a single action press with a 4500 ton cushion. A front to back alignment of the two rigidly joined presses provides a 288-in. long bed which measures 110½ in. right to left between column stops. Conversion from individual to dual



operation is simple. Each draw ram stroke is 60 in.; that of cushion rams is 30 in. Overall height is 52 ft and combined weight is 3,200,-000 lb. Future additions can be made to the machine at either or both ends to result ultimately in an aggregate pressing tonnage of 20,000. Production use will be a stretch-forming operation. Prompt proposal service is available for standard or custom hydraulic press requirements. Lake Erie Engineering Corp.

For more data circle No. 51 on postcard, p. 121.

Dump bucket scoop

This hydraulic dump bucket scoop attachment is for handling bulk materials such as chemicals, sand, coal, etc. The scoop is quickly detachable and can be easily inter-



When you need tubular rivets, you want them GOOD and you want them FAST. 5 Milford plants and 19

Milford offices see that you always get BOTH!



Plants: Milford, Conn.; Norwalk, Calif.; Elyria, Ohio; Aurora, III.; Hatboro, Pa.

Poffices: Atlanta, Chicago, Cleveland, Detroit, Fort Worth, Indianapolis, Newark, New York, Pittsburgh, St. Louis, St. Paul, San Francisco, Seattle — and Norwalk, Calif.; Stratford, Conn.; Charlotte, N. C.; Seneca Falis, N.Y.; Jenkintown, Pa.; Westwood, Mass.

Headquarters for RIVETS

Tubular split and special cold-formed
and Rivet-setting Machines



NEW EQUIPMENT

changed with standard forks on any SpaceMaster electric fork truck. Capacity is 5 or 10 cu ft. Double-acting hydraulic cylinder



allows controlled dumping. To hold material in the scoop it tilts up 10°, and to dump completely, it tilts down 40°. All controls are located in the operator's compartment. Lewis-Shepard Products, Inc.

For more data circle No. 52 on postcard, p. 121.

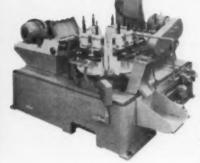
Dust exhauster

The Feifel Dustnaire, for users of grinding machines, is claimed to remove all particles above 5 micron grain size of a specific gravity of 1.5 or higher. There are no filter bags to inspect, repair, or replace; the only maintenance required by the unit being the removal and emptying of the large dust pan



located in its base. All sheet metal used in the design is heavy gage to withstand long, severe usage. Blower is located in the clean air stream to protect it from wear and abrasion. The Dustnaire, with rated capacity of 309 cu ft of air per min, can be moved quickly from grinder to grinder. Abrasive Machine Tool Co.

Precision Pumps for Precision Machinery



GUSHER

Coolant Pumps

Hartford Special Drilling Machine Equipped With a Ruthman Gusher Coolant Pump.



Gusher Coolant Pumps are precision built of the finest materials. The rotating shaft is electronically balanced to cut vibration wear to an absolute minimum. The motor is totally inclosed and dripproof. The heavy-duty ball-bearings are pre-lubricated. You can specify Gusher Coolant Pumps for your precision machinery with the sure knowledge that they will give you efficient service at low maintenance cost.

THE RUTHMAN MACHINERY CO.

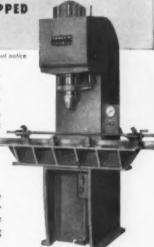
1889-1823 READING ROAD ____ CINCINNATI 2, OHIO

This 25-TON Hannifin Straightening Press Sells For

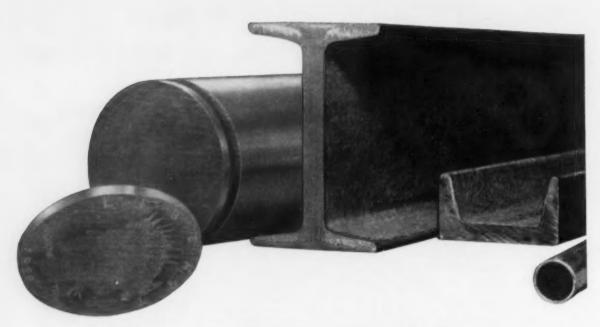
The ideal press for straightening heattreated parts up to 60" between centers. Exclusive Hannifin Sensitive Pressure Control for speed and accuracy. Ram block, two table blocks and center-type fixture complete with rails included.

STRAIGHTENING PRESSES FROM 5 TO 150 TONS

Hannifin offers longer tables and rails, roller-type fixtures, larger or smaller capacities (5 to 150 tons)-all at prices that are easily justified by savings on the job. Bring us your straightening problems.



For more data circle No. 53 on postcard, p. 121. HANNIFIN CORPORATION, 513 S. WOLF ROAD, DES PLAINES, ILLINOIS



What do steel inventories REALLY cost?





You might be shocked to find how fast the hidden costs of carrying steel inventories add up! We know because steel inventories have been our stock in trade for over a hundred years.

But you don't have to tie up plant space and capital in steel you won't use for many weeks—may never use if products or markets change quickly. You don't have to lay out cash for cutting and handling equipment, incur unnecessary scrap loss, or divert manpower to unproductive inventory work.

Instead, you can hold your own inventories to a practical minimum and draw on Ryerson inventories as current requirements arise. At Ryerson you have the world's largest stocks at your disposal—plus unequalled facilities for preparing steel to your order—so you can get delivery of any kind of steel in practically any quantity, within a few hours.

That's why we urge you to consider all your costs when setting inventory policy. And let Ryerson help you release more of the money in steel inventories for profit-producing opportunities. Our inventory experience is at your service.

RYERSON STEEL

Principal products in stock: bars, structurals, plates, sheets, tubing, alloy and stainless steel, reinforcing steel, etc., also machinery and tools



JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK . BOSTON . PHILADELPHIA . CHARLOTTE, N. C. . CINCINNATI . CLEVELAND DETROIT . PITTSBURGH . BUFFALO . CHICAGO . MILWAUKEE . ST. LOUIS . LOS ANGELES . SAN FRANCISCO . SPOKANE . SEATTLE



Markets and Prices

The Iron Age SUMMARY...

Steel demand continues to mount . . . Consumers forced to intensify bid for mill position . . . Inventories relatively low . . . Conversion talk.

Market Stronger . . . Growing strength of the market is forcing more consumers to step up their pitch for mill position. Evidence is increasing that some are lower on inventory than they care to admit. Meanwhile, the rising ingot rate indicates final March figures will be within sight of the 10-million-ton mark.

The spiraling trend of consumer buying has caught even some optimists off guard. A large Mid-western producer of farm equipment was shocked recently to find his inventory running low. And he had based his steel buying pattern on a fairly optimistic prediction of 1955 sales. Further, his dealer stocks are not heavy.

Deliveries Lagging . . . Last-minute discoveries of this sort are having a cumulative effect on pressure for mill deliveries and the scramble to get orders on the books. Producers are being bombarded with requests to take third quarter business. Some are accepting; others are holding out so as not to short-change regular customers.

An illuminating tip-off that some mills are fighting a losing battle to maintain delivery promises is the increasing number of consumers complaining that deliveries are as much as 30 days behind schedule. A few mills are asking customers for permission to extend deliveries.

Automotive Push... Principal reason behind the big push for steel is the record-breaking pace of the automotive industry. The carmakers are pressuring the mills for deliveries. At the same time they're going after their parts suppliers, who in turn are compounding the problems of the steel companies.

But despite all their efforts, the automakers have been running into spot shortages. This has forced them to buy small tonnages from otherthan-usual sources at premium prices.

Conversion Interest . . . While few actual deals have been made, interest in conversion is mounting. Conversion is a high-cost method of obtaining steel requirements. But it is the lesser of two evils when a consumer is confronted with the possibility of slowing his production lines or paying more to keep them running.

Steel users are still struggling without too much success to rebuild their inventories. They have more than one incentive. Apart from a desire for stock to meet their projected requirements, they realize it's like money in the bank. Steel labor negotiations this summer are likely to result in higher wages and compensating price boosts.

Steel Output, Operating Rates

Production	This Weekt	Last	Month Ago	Year Ago
(Net tons, 000 omitted)	2,255	2,231	2,150	1,613
Ingot Index				
(1947-49=100)	140.0	139.0	133.8	100.4
Operating Rates				
Chicago	97.0	97.0*	91.0	78.0
Pittsburgh	94.0	94.0*	90.0	74.0
Philadelphia	95.5	91.0*	84.0	65.0
Valley	92.0	92.0*	88.0	61.0
West	92.5	92.5*	88.0	76.0
Detroit	90.0	90.0	92.0	79.0
Buffalo	100.0	0.001	100.0	69.5
Cleveland	97.0	97.0	92.5	58.0
Birmingham	87.5	86.5	85.5	78.5
S. Ohio River	80.5	76.0	70.0	76.0
Wheeling	96.0	98.0*	98.0	83.0
St. Louis	87.0	96.0	103.0	43.5
Northeast	85.5	84.0	97.5	51.5
Aggregate	93.5	92.5	88.5	68.0

*Revised. †Tentative

Prices At A Glance

{	cents per lb	unless	otherwise	noted)
	This	Wook	Month	Year
	Week	Ago	Ago	Ago
Composite prices				
Finished Steel, base	4.797	4.797	4.797	4.634
Pig Iron (Gross ton)	\$56.59	\$56.59	\$56.59	\$56.59
Scrap, No. 1 hvy				
(gross ton)	\$37.50	\$37.58	\$36.33	\$23.33
Nonferrous				
Aluminum, ingo	23.20	23.20	23.20	21,50
Copper, electrolytic	33.00	33.00	33.00	29.87
Lead, St. Louis	14.80	14.80	14.80	12.80
Magnesium, ingo	27.75	27.75	27.75	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y	. 90.625	90.62	5 90.125	92.50
Zinc. E. St. Loui	s 11.50	11.50	11.50	9.25

Automotive Demands Rising

Finished steel record set in January . . . No letup seen in upsurge . . . Sheets, bars, stainless pacing the way . . . Warehouses, construction taking increased share.

◆ FULL IMPACT of automotive steel buying is becoming more apparent week by week. More finished steel was shipped from mills to the auto industry in January than in any previous month. America: Iron and Steel Institute says automakers took 1,559,774 tons of finished steel in January, equal to 26.9 pct of total domestic shipments.

Continued strength of the auto industry's demand is indicated in that it was the second straight month that steel shipments to auto plants set a new tonnage high. In individual markets, reports of continued strength in sheets, bars, stainless, spring wire and other products are traced to demands of the auto industry.

But strength continues from most directions and competition for many products is keen. All but four domestic industries received a larger tonnage from steel mills in January than they did in December.

Exceptions were in construction, non-automotive forgings, agricultural, and ordnance. Agricultural and construction, of course, are following seasonal patterns and demand for these markets has picked up considerably since January.

The construction industry, in fact, ranks third among market classifications, behind automotive and warehouses. At the January rate, warehouses were taking 17.8 pct of the total finished steel shipments and construction 9.6 pct.

Most mills are now booking third quarter on strong products. These include cold-rolled sheets, galvanized, stainless and, in some cases, plates. Warehouses also owe some of their increasing business to hard-pressed automakers who frequently have to go to premium sources to meet consumption demanded by the current auto production rate. Last week U. S. and Canadian auto plants turned out 180,972 passenger cars.

High winds that hit Pittsburgh and Western Pennsylvania last week toppled ore bridges at plants of U. S. Steel Corp. and Bethlehem Steel Corp. Two U. S. Steel blast furnaces were out of production 3-4 days but the loss had no effect on steel output. Bethlehem immediately switched to a spare bridge and the loss had only temporary effect on iron production. Replacement cost in each case will run about \$1 million.

SHEETS AND STRIP . . . Pittsburgh mills now booking into third quarter and orders are very strong. Some leveling off is inevitable however. Delivery is a problem for both consumer and producer with deliveries falling farther behind. Cold-rolled strip booked through June in Chicago; galvanized on quota for third quarter. No letup from Detroit where most of the pressure originates. Hot-rolled strip is being booked through June in most markets; cold-rolled strip varying with availability of slitters for coils.

Purchasing Agent's Checklist

SHIPYARDS: Govt. funds total nearly \$500 million for private yards p. 59

ORE: New sources start paying off with Labrador a very important factor p. 62

AIRCRAFT: New ordering revives West Coast's No. I metalworking employerp. 85 STAINLESS . . . Demand is universally strong, from automotive, construction, dairy sources; a Pittsburgh mill is already booking strong into third quarter; Cleveland 8 to 10 weeks out in front.

TIN PLATE . . . Strong demand in most markets where consumers are located. Bookings are full for entire second half and some third quarter orders have been accepted.

BARS... Cold-finished, alloy and carbon bars all continuing to gain with Cleveland showing most strength, principally from automotive sources. Detroit picking up at same level. Pittsburgh shows same trend with plate demand causing some competition for rolling material between mill divisions. Continuous gain in Chicago with deliveries into May.

PLATES . . . Among the tightest; welded pipe for oil and gas transmission lines push this product far out on delivery date. . . . A large Chicago consumer was told August delivery for a really big tonnage although small amounts can be booked in May or June by an enterprising purchasing agent. Plates are also part of competition among mill divisions with as much as possible claimed by the super-strong sheet demand. Demand is universal in most districts with some new railroad purchasing observed in eastern markets; shipyards are not active, however.

STRUCTURALS . . . Strong construction demand despite seasonal factors plus roadbuilding programs keep structurals strong. Wide flange structurals continue to lead in strength, light structurals right behind. Heavy structurals available up to seven weeks in Chicago, wide flange out to June or July. Light structurals filling up in most markets and strong in Midwest. West hopeful of upturn when highway program gets going in the spring.

WIRE . . . This reliable market barometer shows steady strength and gains in some markets. One eastern producer reports 146 pct increase in wire fabric bookings in February as highway builders get moving. Merchant and construction products are into third quarter in Pittsburgh. Automotive figures in very strong demand for spring wire originating in Detroit for car seats and connections. Seasonal upswing in demand from farm sources is a factor in strengthening Chicago market for wire products.

Comparison of Prices

Mar. 8

1955

\$61.10

56,50 60,43

62.68

56.50

66.27 66.60 66.50

9.504

\$56.59

39.75

45,50

\$37.58

33.00

11.50 14.80 23.20

67.67 27.75

Mar. 15

56.50 60.43

52.88

56.50

9.504

Pig Iron: (per gross ton)
Foundry, del'd Phila.....
Foundry, Valley
Foundry, Southern, Cin'ti ...

Foundry, Southern, Cin'ti Foundry, Birmingham Foundry, Chicago Basic, del'd Philadelphis Basic, Valley, furnace Malleable, Chicago Malleable, Valley Ferromanganeset, cents per ib. ‡ 74-76 pet Mn base.

Steel Scrap Composite: (per gross ton)
No. 1 heavy melting scrap ... \$37.50

Nonferrous Metals: (cents per pou Copper, electrolytic, Conn. Copper, Lake, Conn.
Tin, Straits, New York
Zine, East Bt. Louis
Lend, St. Louis
Aluminum, virgin ingot
Nickel, electrolytic
Magnesium, ingot
Antimony, Laredo, Tex.
Tentative. ‡ Average. * Revised.

Coke, Connellaville: (per net ton at oven)
Furnace coke, prompt \$14.38
Foundry coke, prompt 16.75

Nonferrous Metals: (cents per pound to large buyers)

(Effective Mar. 15, 1955) Feb. 15

1955

56.50 68.43

52,88

56,50 60,27 56,60 56,50 56,50

9.50¢

\$56.69

37,00

29.00 36.50 43.50

45.00

\$36.33

53.00

67.67 27.76 28.50

1954

861.19

52.68

56.54

60.27 56.00 56.50 56.50

10.00#

\$54.69

22.00

16.50 26.50 41.50 $38.50 \\ 37.00$

\$23.33

29.8751

80.00 92.50 9.25 12.80

68.68

Steel prices on this page are the average of various f.o.b. quotations major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown

advances over previous week are printed in Heavy Type;

declines	appear	in	Ital	ica.

4.05¢ 4.95 5.45 4.06 5.79 4.225 9.39 41.50	4.05¢ 4.95 5.45 4.05 5.79 4.225 9.36 41.50	4.05¢ 4.95 5.45 4.05 5.79 4.225 9.30 41.50	3.9254 4.775 5.276 8.925 8.513 4.10 9.30 41.50
4.95 5.45 4.05 5.79 4.225 9.39 41.50	4.95 5.45 4.06 5.79 4.225 9.36 41.50	4.95 5.45 4.05 5.79 4.225 9.30	4.775 6.276 8.926 8.518 4.10 9.30
4.95 5.45 4.05 5.79 4.225 9.39 41.50	4.95 5.45 4.06 5.79 4.225 9.36 41.50	4.95 5.45 4.05 5.79 4.225 9.30	4.775 6.276 8.926 8.518 4.10 9.30
5.45 4.05 5.79 4.225 9.39 41.50	5.45 4.05 5.79 4.225 9.80 41.50	5.45 4.05 5.79 4.225 9.30	5.275 8.925 8.518 4.10 9.30
4.05 5.79 4.225 9.39 41.50	4.05 5.79 4.225 9.36 41.50	4.05 5.79 4.225 9.30	8.925 8.518 4.10 9.30
5.79 4.225 9.39 41.50	5.79 4.225 9.36 41.50	5.79 4.225 9.30	8.518 4.10 9.30
4.225 9.39 41.50	4.225 9.36 41.50	4.225 9.30	4.10 9.30
9.39 41.50 \$9.05	9.36 41.50	9.30	9.30
41.50 \$9.05	41.50		
	*0.05		
	*0.05		
		\$9.05	\$8.95
	7.75	7.75	7.65
7.85	7.85	7.86	7.75
4.304	4.30#	4.304	4.164
			5.20
			4.875
			4.10
			35.50
10.40	10.40	10.40	10.40
5.754	5.75¢	5.75¢	5.525
84.45	\$4.45	84.45	\$4.825
5.35	6.35	8.35	5.20
\$64.00	\$64.00	\$54.00	\$62.00
64.00	64.00	64.00	62.00
78.00	78.00	78.00	75.50
86.00	86.00	86.60	82.00
4.675¢	4.6754	4.675€	4.525
8.90	8.90	3.90	8.75
	4.30¢ 5.4075 4.25 35.66 10.40 5.75¢ \$4.45 5.35 864.00 64.00 78.00 86.00	4.30¢ 5.40 5.40 5.40 5.40 5.40 5.40 5.40 5.40	4.30¢ 4.30¢ 5.40 5.40 5.40 5.40 5.40 5.40 5.40 5.50 5.5

Finished.	Ganal	63	
# Intraded	Dies	Comi	009118

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Phila-delphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

38.00

23.00

67.67

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Phila-delphia and Chicago.

PIG IRON

Dellars per gross ton, f.o.b., subject to switching charges.

STAINLESS STEEL

To identify producers, see Key on P. 167->

Rese	melen	conta	-	16.	Inh.	mill

Producing Paint	Basic	Fdry.	Mall.	Bess.	Phos.
Bethlehem B3	58.00	58.50	59.00	59.50	
Birmingham R3	52.38	52.88			
Birmingham W9	52.38	52.88			
Birmingham U4	52.38	52.88	56.50		
Buffalo R3	56.00	56.50	57.00		
Buffalo ///	56.00	54.50	57.00		
Buffalo W6	\$6.00	56.50	57.00	******	
Chicago 14	56.88	56.50	56.50	57.00	
Cleveland A5	54.00	56.50	56.50	57.00	61.00
Cleveland R3		56.50	56.50		
Daingerfield L3.		52.50	52.50		
Duluth 14	56.00	56.50	54.50	57.00	
Eria 14	54.00	54.56	56.50	57.00	
Everett M6		61.00	61.50		
Fentana K1	62.00	62.50			
Geneva, Utah C7		56.50			
Granite City G2.		58.40	58.90		
Hubbard Y/		-	56.50		
Minnegus C6		59.00	59.00		
Manassen P6			-		
Navilla Isl. P4.		56.50	56.50		
N. Tenawanda T		E4 E4	57.88	1	1
Pittaburgh UI				\$7.00	****
Sharpaville S3		54.50	54.50	57.00	
So. Chicago R3.				24100	NAME OF
		58.50	59.00	Ta 50	64.0
Steelton B3		58.50	59.00	59.56	1
Swedeland A2		54.50	56.50	57.00	
Toledo /4		58.50			1000
aungstewn YI.		38.50	59.00	59.50 57.88	64.0

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct allican over base (1.75 to 2.25 pct except law phen., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, 32 per ton for 0.5 to 0.75 pct mickel, 31 for each additional, 0.25 pct mickel. Subtract 38¢ per ton for phenopherus content 0.70 and over.

Silvery Irea: Buffale, HI, \$66.25; Jackson, JI, GI, \$65.00. Add \$1.00 per ton for each 0.50 pct silicen over hase (6.01 to 6.50 pct) up to 17 pct. Add \$1 per ton fer hase (6.01 to 6.50 pct) up to 17 pct. Add \$1 per ton fer each 0.50 pct emanganese ever 1.0 pct. Beasemer ferresilicen prices are \$1 over comparable silvery iren.

Product	381	382	303	384	316	321	347 Cb	410	416	434
Ingets, recelling	16.75	17.75	19.25	19.00	29.75	23,50	35.50	14.00	-	14.25
Slahs, billets, recelling	21.00	23.25	25.25	24.50	38.00	30.25	46.75	18.25	-	18.5
Forg. discs, die blocks, rings	39.00	39.00	42.60	41.25	61.75	46.25	-	31.60	31.75	31.7
Billets, forging	30.00	30.25	32.75	31.75	48.25	36.00	\$4.75	24.00	24.50	24.5
Bars, wires, structurals	35.75	36.00	38.75	38.00	57.25	42.75	64.25	28.75	29.25	29.2
Plates	37.75	38.00	40.25	49.50	60.50	46.50	69.25	30.00	30.50	30.5
Sheets	41.75	42.00	49.25	44.50	64.50	51.25	77.50	34.25	41.25	34.7
Strip, hot-rolled	36.25	32.50	37.25	35.00	55.00	41.75	63.00	26.25	-	27.0
Strip, cold-rolled	38.75	42.00	46.00	44.50	64.50- 64.75	\$1.25- \$1.50	77.50	34.25	41.25	34.71

STAINLESS STEEL PRODUCING POINTS:

Shetts: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A1; McKeesport, Pa., U1; Washington, Pa., W2, J2; baltingerine. E1; Middletown, O., A1; Massilion, O., R3; Cary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, J4 hiladelphia, D3.

Strip: Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Roading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrisson, N. J., D3; Youngstown, C5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (.25¢ per lb higher) W1 (.25¢ per lb higher); New Bedford, Mass., R6.

Ber: Beltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., I2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T3; Ft. Wayne, I4; Philadelphia, D5.

Wirs: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7 Dunkirk, A3; Monessen, F1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracine, C11.

Plate: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., 12; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatswille, Pa., C15; Philadelphia, D5.

Forged discs, die blocks, rings: Pittsburgh, CII; Syracuse, CII; Ferndalt, Mich., A3; Washington, Pa., J2.

Forgings billets: Midland, Pa., CII: Baltimore, A7; Washington, Pa., J2; McKeespert, FI; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, CII.

Strong Demand Will Continue

Eastern price off slightly . . . But no weakening is seen as tight supply and heavy needs keep pressure on market . . . Chicago price advances \$1 on heavy buying wave.

The scrap market held generally firm this week. Slight easing of Eastern price was not seen reflecting any basic change in the strong market condition. Uncertainty over export curbs and some buying resistance were depressing influences in this area but it was felt that these factors could not permanently offset solid domestic and export demands.

Chicago prices were definitely on the up-grade with strong rail purchases leading the move. New specifications for scrap steel futures have been initiated by the Chicago Mercantile Exchange. Proposed specifications would change the basic contract from 40 to 80 tons while retaining brokerage cost of \$18. Inspection point and contract month changes are included in proposal.

THE IRON AGE Heavy Melting Steel Scrap Composite dropped 8¢ to \$37.50 as the overall market strength minimized the effect of Eastern losses.

Pittsburgh... Prices on openhearth grades remain unchanged this week with no new sales reported. Nothing to indicate any weakening of the market and it looks as if some sizeable purchases are brewing. Prices on No. 1 RR heavy melting advanced 50¢ and short rails and specialities are up \$1 on the basis of the latest RR lists. Blast furnace grades remain strong with Canadian inquiries tightening New England market sources.

Chicage . . . With repeated sales in the past 2 weeks accented by a flurry of buying at the middle of last week, Chicago scrap prices were again moving up this week led by strong railroad purchases. Chicago continued to lag below its historic relation with Eastern prices but pricing continued strong. Some confusion is reported

among sellers of mixed borings and turnings as to the pricing.

Philadelphia . . . Market has weakened temporarily. On basis of the latest sale, price of No. 1 heavy melting dropped \$1 per ton to \$39, top. The weakness apparently is due to a combination of scrap industry concern over relations with their domestic customers plus a brief lull in pressure for export tonnages. Recent Washington discussions on exports also have made an impression in the trade,

New York . . . Market remains steady. Some resistence among domestic buyers was noted and heavy dock loads are causing hesitation on the part of exporters but basic demand remains solid. Cast grades advanced \$2 to \$3 on the strength of local buying. There were no firm indications that the easing of Philadelphia market had extended to New York.

Detroit . . . There have been no important purchases of scrap reported here since a mill buy on a \$29.50 basis last week. While some activity has been reported in cast grades, buying is spotty. Scrap sources report, however, that supplies of desirable cast grades are definitely limited, which could result in scattered purchases of top grade quality material at considerably more than prices reported by IRON AGE. Indications are that local mill buying may be on a strictly limited basis for the remainder of the month.

Cleveland... A local mill returned to the market last week with a relatively small purchase of No. 1 heavy melting at \$36. Additional tonnage was placed on a springboard arrangement. The same mill also purchased No. 2 bundles at \$30 or \$2 higher than previous market. A Valley mill also placed order for substantial tonnage of No. 1 heavy melting at prevailing price of \$38. Demand continues strong for blast furnace grades for greatest

hot metal output by mills while openhearth and electric grades remain firm but quiet. Railroad and foundry grades also remain in higher demand with \$1 to \$2 rises in some grades.

Birmingham . . . An unexpected shortage of No. 2 heavy melting steel developed in the area this week and some brokers were reported paying the same price they are getting for it and in some instances more, to fill orders. Some steel scrap items advanced again this week and dealers and brokers believe prices will go still higher. Asking prices in new railroad lists are higher than now being paid.

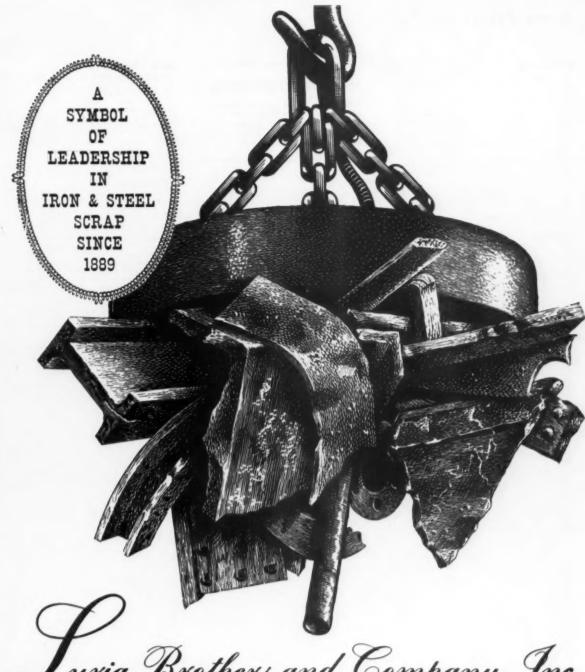
St. Louis . . . The scrap iron situation remains unchanged with weather conditions favorable for collection of material, shipments against orders are equal to the melt of the district mills. No more buying is expected until late in the month for April shipment. Prices are unchanged.

Cincinnati . . . A local mill, long out of the market, made its biggest purchase in a year last week at \$36 delivered for No. 1 heavy melting with substantial tonnage in most steelmaking grades. This boosted No. 1 price \$1 and No. 2 heavy melting price \$2. Total tonnage was estimated at in excess of 15,000. Dealers claim available stocks in town are adequate to handle the purchase although river shipments to Pittsburgh will probably be stopped temporarily. Newport Steel returned four openhearths to service early this week after passing of the flood crest.

Buffalo . . . Strength continues in the scrap market here with new buying boosting cast prices \$1 per ton. Blast furnace items are supported by sales at higher levels in the nearby Niagara Falls market.

Boston . . . For the first time in months cast items moved up in line with other scrap. General rise included all items except clean cast chemical borings, which did not change, and unstripped motor blocks, which were dropped a dollar and continued as a nominal price item. Fair activity was reported for the Boston area.

West Coast . . . Scrap market is active. Dealers and mills feel current prices will remain for at least the rest of the month. Supplies in Seattle, San Francisco, and Los Angeles are adequate.



uria Brothers and Company, Inc.

MAIN OFFICE

LINCOLN-LIBERTY BLDG.

Philadelphia 7, Penna.

PLANTS

DETROIT (ECORSE), LEBANON, PENNA. READING, PENNA. MICHIGAN MODENA, PENNA. PITTS ERIE, PENNA. PITTSBURGH, PENNA.

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EXPORTS - IMPORTS - LIVINGSTON & SOUTHARD, INC., 99 Park Avenue, New York, N. Y. Cable Address: FORENTRACO

March 17, 1955

Scrap Prices	(Effective Mar.
Pittsburgh No. 1 hvy. melting No. 2 hvy. meiting No. 1 bundles	\$38.00 to \$39.00 35.00 to \$6.00 38.00 to 39.00
No. 3 bundles Machine shop turn. Mixed bor, and ms, turns. Shoveling turnings Cast iron borings	31.00 to 32.00 22.00 to 23.00 22.00 to 23.00 36.00 to 27.00 26.00 to 27.00
Low phos. punch'gs, plate. Heavy turnings No. 1 RR. hvy. melting. Gerap rails, random igth. Rails 2 ft and under. RR. steel wheels RR. spring steel RR. spring steel RR. couplers and knuckles.	41.00 to 42.00 85.00 to 36.00 40.50 to 41.50 46.00 to 47.00 51.00 to 52.00 45.00 to 46.00 45.00 to 46.00 45.00 to 46.00
No. 1 machinery cast Cupola cast	48.00 to 44.00 89.00 to 40.00 84.00 to 85.00
No. 1 hvy. melting	
Machine shop turn. Mixed bor, and turn. Shoveling turnings Cast iron borings Low phos. forge crops	17.00 to 18.00 19.00 to 20.00 19.00 to 20.00 19.00 to 20.00 39.00 to 40.00
Low phos. punch'gs, plate Low phos. 3 ft and under. No. 1 RR. hvy. melting Scrap rails, random lgth. Rerolling rails	37.00 to 38.00 36.00 to 37.00 38.00 to 39.00 40.00 to 41.00 50.00 to 51.00
Rails 2 ft and under Locomotive tires, cut Cut bolsters & side frames Angles and splice bars . RR. steel car axies RR. couplers and knuckies.	37.00 to 38.00 38.00 to 39.00 44.00 to 45.00 43.00 to 44.00
No. 1 machinery cast. Cupola cast. Heavy breakable cast. Cast iron brake shoes Cast iron car wheels Malleable Stove plate	34,00 to 36,00 35,00 to 36,00 37,00 to 38,00 45,00 to 46,00

Philadelphia Area

rniidaeipnia Area		
No. I hvy. melting	\$38.00 tol	39.00
No. 2 hvy. melting	34.00 to	35.00
No. 1 bundles	38.00 to	29,00
No. 2 bundles	30,00 to	31,00
Machine shop turn	21.50 to	33.50
Mixed bor, short turn,	21.50 to	22.50
Cast iron borings	20.50 to	21.50
Shoveling turnings	23.50 to	25.00
Clean cast chem. borings	28.00 to	29,00
Low phos. 5 ft and under.	41.50 to	42.50
Low phos. 2 ft and under.	43.00 to	44.00
Low phos. punch'gs	43.00 to	44.00
Elec. furnace bundles	40.00 to	41.00
Heavy turnings	35.00 to	36.00
RR. steel wheels	41.50 to	42.50
RR. spring steel	41.50 to	42.50
Rails 18 in, and under	61.00 to	53.00
Cupola cast	36,00 to	38.00
Heavy breakable cast	38.00 to	39.00
Cast Iron car wheels	44,00 to	45.00
Malicable	44.00 to	45.00
Unstripped motor blocks	37.00 to	38.00
No. 1 machinery cast	44.00 to	45.00
Charging box cast	37.00 to	28,00

Cleveland

No. 1 hvy. melting 8	34.00	to	\$36,00
No. 2 hvy, melting	30,00	to	31.00
No. 1 bundles	34.00	to	26,00
No. 2 bundles	29.00	to	30.00
No. 1 busheling	34.00	to	36.00
Machine shop turn	18.00	to	19.00
Mixed bor, and turn	23.00	to	25.00
Shoveling turnings	22.00	to	25.00
Cast iron borings	23,00	to	25.00
Cut struct'r'l & plates, 2 ft			
& under	43.00	to	43.00
Drop forge flashings	34.00	to	36.00
Low phos. punch'gs, plate.	34.00	to	36.00
Foundry steel, 2 ft & under	40.50	to	41.50
No. 1 RR, heavy melting	36,00	to	27.00
Rails 2 ft and under	49.00	to	50.00
Rails 18 in. and under	50.00	to	51.00
Railroad grate bars	27.00	10	28.01
Steel axle turnings	37.00		
Railroad cast	45.00	to	46.00
No. 1 machinery cast	45.00	to	46.00
Stove plate	42.00		
Malleable	44.00	to	45.0

Iron and Steel Scrap

Going prices of Iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting		
No. 2 hvy. melting	34.00	to 35.00
No. 1 bundles	37.00	to 38.00
No. 2 bundles		
Machine shop turn	20.00	to 21.00
Shoveling turnings		26.00
Cast iron borings		26.00
Low phos. plate	37.00	to 38.00

Buffalo			
No. 1 hvy. melting	32.00	to \$	83.00
No. 2 hvy. melting	29.00		30.00
No. 1 busheling	32.00	to :	83.00
No. 1 bundles	32.00	to :	33.00
No. 2 bundles	27.00	to :	28.00
Machine shop turn	20.50	to :	31.50
Mixed bor, and turn	22.00	to :	23.00
Shoveling turnings	23.00	to :	24.00
Cast iron borings	22.00	to :	23.09
Low phos. plate	35.00		36.00
scrap rails, random igth	35.00	to i	36.00
Rails 2 ft and under	42.00	to	43.00
RR. steel wheels	36.00		87.00
RR. spring steel	36.00	to :	37.00
RR couplers and knuckles	36.00	to !	27.00
No. 1 machinery cast	42.00	to :	43.00
No. 1 cupola cast	37.00	to :	38.00

Detroit		
Brokers buying prices per gro	es ton, es	cara:
No. 1 hvy. melting		
No. 2 hvy. melting	23.00 to	24.00
No. 1 bundles, openhearth.	28.50 to	29.50
No. 2 bundles	21.00 to	22.00
New busheling	27.00 to	28.00
Drop forge flashings	27.00 to	28.00
Machine shop turn	13.00 to	14.00
Mixed bor, and turn	15.50 to	16.50
Shoveling turnings	16.50 to	17.50
Cast iron borings	16.50 to	17.50
Low phos. punch'gs, plate.	28.50 to	29.50
No. 1 cupola cast	34.00 to	26.00
Heavy breakable cast	25.00 to	27.00
Stove plate	30.00 to	32.00
Automotive cast	38.00 to	40.00

St. Louis

No. 1 bvy. melting	31.00 to	\$32.00
No. 8 hvy. melting	29.00 to	30.00
No. 1 bundles	20.00 to	31.00
No. 8 bundles	24.50 to	25.50
Machine shop turn	15.50 to	16.50
Cast. iron borings	15.50 to	16.50
Shoveling turnings	17.00 to	18.00
No. 1 RR. hvy, melting	35.00 to	36.00
Rails, random lengths	40.00 to	41.00
Rails, 18 in, and under	47.00 to	48.00
Locomotive, tires uncut	85.50 to	36.50
Angles and splice bars	35.50 to	36.50
Std. steel car axles	35.50 to	36.50
RR. spring steel	37.00 to	38.00
Cupola cast	43.00 to	43.00
Hvy. breakable cast	33.00 to	24.00
Cast iron brake shoes	29.00 to	30.00
Stove plate	34.00 to	25.00
Cast Iron car wheels	34.50 to	36.50
Malleable	35.00 to	36.00
Unstripped motor blocks	32.50 to	33.50

Boston

Brokers buying prices per gro	es ton, on	CAFE:
No. I hvy. melting	\$30,00 to !	31.00
No. 2 hvy. melting	25.00 to	25.50
No. 1 bundles	30,00 to	31.00
No. 2 bundles	21.00 to	22.00
No. 1 busheling	28,00 to	28,50
Elec. furnace, 3 ft & under	32,00 to	33,00
Machine shop turn	12.00 to	12.50
Mixed bor, and short turn.	14,00 to	14,50
Shoveling turnings	14.50 to	15.00
Clean cast chem. borings	18.00 to	19,00
No. 1 machinery cast	31,00 to	32.00
Mixed cupola cast	29,00 to	30.00
Heavy breakable cast	27,00 to	28,00
Stove plate	27,00 to	28.00
Unstripped motor blocks	17.00 to	18.00

New York

Brokers buying prices per grou	m ten, on	CREST
No. 1 hvy. melting		34.00
No. 2 hvy. melting		30.00
No. 2 bundles	25.50 to	26.50
Machine shop turn	11.00 to	12.00
Mixed bor. and turn		13.00
		15.00
Clean cast chem. borings	22.00 to	23.00
No. 1 machinery cast	37.00 to	39.00
Mixed yard cast	31.00 to	32.00
Charging box cast	30.00 to	31.00
Heavy breakable cast	30.00 to	31.00
Unstripped motor blocks	22.00 to	23.0
Birmingham		

)

13 %

No. 1 hvy. melting	32.00	to	\$33.00
No. 2 hvy. melting	27.00		28.00
No. 1 bundles	32.00		
No. 2 bundles No. 1 busheling	32.00		
Actual Management Control of the Con			
Machine shop turn Shoveling turnings	17.00		18.06
Cast iron borings	17.00		18.00
Electric furnace bundles	33.00		33.00
Bar crops and plate	36.00		37.00
Structural and plate, 2 ft.	36.00		37.00
No. 1 RR, hvy, melting	36.00	to	37.00
Scrap rails, random lgth	39.00		40.00
Rails, 18 in. and under	42.00		
Angles & splice bars	40.00		41.00
Rerolling rails	43.00	to	44.00
No. 1 cupola cast	45.00		46.00
Stove plate	42.00		
Charging box cast	22.00		34.00
Cast Iron car wheels Unstripped motor blocks	35.50		36.56
Mashed tin cans	15.00		16.06

Cincinnati

Cincinnati		
Brokers buying prices per gro-	as ton, or	CBP:
No. 1 hvy. melting	133,00 to	\$34.00
No. 2 hvy. melting	30,00 to	31.00
No. 1 bundles	33.00 to	34.00
No. 2 bundles	24.00 to	25.00
Machine shop turn	19.00 to	20.00
Mixed bor, and turn.	20,00 to	21.00
Shoveling turnings	22.00 to	23.00
Cast iron borings	20,00 to	21.00
Low phos., 18 in. & under.	37.00 to	38.00
Rails, random lengths	41.00 to	42.00
Rails, 18 in. and under	47.00 to	48.00
No. 1 cupola cast	39.00 to	40.00
Hvy. breakable cast	34.00 to	35.00
Drop broken cast	44.00 to	45.00

San Francisco No. 1 hvy. melting

No. 2 hvy. melting		25.00
No. 1 bundles	**	26.00
No. 2 bundles		22.00
No. 3 bundles		18.00
Machine shop turn		8.00
Cast iron borings		9.00
No. 1 RR. hvy. melting		27.00
No. 1 cupola cast		40.00
Los Angeles		
No. 1 hvy. melting \$	28.00 to	\$30.00
No. 2 hvy. melting	26,00 to	27.00
No. 1 bundles	27.00 to	
No. 2 bundles	22.00 to	23.00
No. 3 bundles	18.00 to	20.00
Machine shop turn		8.00
Shoveling turnings		10.00
Cast iron borings		10.00
Elec. furn. 1 ft. and under	28.00 to	30.00
No. 1 RR. hvy. melting	28.00 to	30.00
No. 1 cupola cast	41.00 to	42.00
Seattle		
No. 1 hvy. melting		\$31.00
		27.00
No. 1 bundles		23.00
No. 2 bundles		20.00
No. 3 bundles		16.00
No. 1 cupola cast		35.00
Mixed yard cast		35.00
11 111 0 -1		

	\$32.00
No. 2 hvy. melting	29.00
No. 1 bundles	32.00
No. 2 bundles	26.00
Mixed steel scrap	26.00
Bushelings	27.00
Bush., new fact prep'd	30.00
Bush., new fact unprep'd.	26.00
Short steel turnings	12.00
Mixed bor. and turn	12.00
Rails, rerolling	41.00
Cast scrap \$42.00 to	45.00

You can't beat Ohio Magnets for

heavier construction

ONIO BOLLED MAGNETS.
12 to 65" dia. 6-coil types in 39 to 65". 8-coil in 55 & 65". Strap coils over 39". Bolts protected in recessed wells. Also capsule-coil ever 45".

In slag reclamation or rough service—or any use where magnets are subjected to hard knocks—you need the extra heavy construction and greater lifting power of Ohio Magnets.

This super-strong Ohio Basket Magnet has an outer ring with integrally cast fenders that project beyond magnet diameter to ward off and protect against damaging blows. Extra heavy top plate is held in place with strong nickel-steel bolts.

For extra magnet life, extra magnet value-specify Ohio Magnets. Remember, Ohio Magnets lift larger loads longer-especially with Ohio Magnet Controllers.

Send for Bulletin No. 112. Offices in principal cities listed in Classified Directory.

Obio gives prompt service in reconditioning and rebuilding magnets



OHIO WELDED MAGNETS. 39 to 65" die. Lightweight models. in 39 & 43". 6-coli in 46, 53, 63"; 8-coli in 55 & 65". Weld on top where it con't get dented in. Mac coprole-coli over 45".





THE OHIO ELECTRIC MFG. CO.

CHESTER BLAND President

May Divert Stockpile Aluminum

To help ease aluminum pinch, government was considering diverting around 25,000 tons from stockpile . . . Producers would be responsible for distribution.

 SCARCITY of aluminum has caused the government to consider diverting metal from its stockpile for industry use. Amount of aluminum involved was reported to be somewhere in the neighborhood of 25,000 tons.

Under the plan being mulled over by Office of Defense Mobilization late last week, the 25,000 tons of aluminum which was to have been delivered to the government stockpile during the first and second quarters would have to be made up through increased shipments to the stockpile during the last half of the year.

Final decision on whether to go through with the plan was expected early this week. It was believed that if the proposal received an okay, aluminum producers rather than the government would decide how the 25,000 tons would be distributed to industrial users.

It also seemed probable that the government was considering some sort of controls over aluminum exports, as has been suggested at various times by some industry groups.

ALUMINUM . . . Prices remained steady through last week in spite of strong demand. What happens to price levels this week could be affected by what the government decides to do about diverting aluminum from its stockpile. But if the amount held out of the stockpile holds near

the 25,000 ton figure which has been mentioned, it was not expected that the government action would influence prices very much.

Smelters report demand is still strong, but some see signs the pressure may ease in the near future. Trend may become apparent this week when the biggest slug of April bookings will be made. If the market runs according to form demand should then begin to taper off. This picture could change, however, if demand from automotive, steel, and appliance industries maintains its current strength.

Shipments of aluminum products in January, as reported by Aluminum Assn., for the most part were above the previous month's levels.

Foil shipments were off slightly dropping from 7815 tons in December '54 to 7738 tons for January of this year. Sheet and plate shipments, however, showed a considerable gain, hitting 52,472 tons in January compared with 47,538 tons in December.

Following are January aluminum mill product shipments as compared with December '54 totals. Figures for all products are in net tons:

	Jan.	Dec.
Sheet & Plate, total	52,477	47,538
Non-Heat-Treatable	40,506	36,584
Heat-Treatable	11,967	10,954
Foll	7,738	7,815
Extruded Products, total	14,509	13,359
Soft Alloys	12,439	11,172
Hard Alloys	1,871	2,188
Tube, Drawn, total	3,267	2,579
Soft Alloys	3,109	2,327
Hard Alloys	108	253
Rod & Bar, Rolled	6,632	6,309
ACSR & Cable, Bare	4,880	4,274
Wire, Other than Conductor	2,098	1,729
Forgings	1,969	2,117
Castings, total	14,658	14,305
Sand	791	787
Permanent Mold	6,891	6,962
Die	6,976	4,557

Daily Nonferrous Metal Prices

(Cents per Ib except as noted)

	Mar. 9	Mar. 10	Mar. 11	Mar. 12	Mar. 14	Mar. 15
Copper, electro, Conn.	33.00	33.00	33.00	33,00	33.00	33.00
Copper Lake, delivered	33.00	33.00	33.00	33.00	33.00	33.00
Tin, Straits, New York	91.125	91.25	91.25		90.625	90.625*
Zinc, East St. Louis	11.50	11.50	11.50	11.50	11.50	11.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80
Note: Quotations are going	prices					Tentative

Early this week production started on Aluminum Co. of America's two new aluminum welded tube mills at Alcoa, Tenn. The new mills give the company capacity to produce welded aluminum tube and pipe from ½ in. to 8 in. diam.

COPPER... Price of spot copper in London rebounded late last week to the U. S. equivalent of 43¢ per lb, but the domestic market was quiet. Major producers maintain their cautious attitude about committing themselves on April deliveries.

1

Copper scrap market was inactive as only one refiner was paying 32e per lb for No. 2 heavy copper and wire. One reason for the lack of action in this market is the fact that refiners have been buying in exceptionally large quantities over the last several months and are now more interested in taking delivery rather than placing new orders.

Late last week Copper Range Co. disclosed that its White Pine development is nearly completed and that the mine is turning out 8000 tons of ore daily.

LEAD, ZINC . . . Seasonal factors continue to keep demand for lead on the light side, but producers are satisfied with the volume of business they are doing. Zinc sellers reported there was fair demand for Prime Western grade while Special High is still being sought actively.

Andrew Fletcher, head of St. Joseph Lead Co., predicted last week that lead consumption in the U. S. this year may amount to 1,2 million tons, a gain of 10 pct from last year's level. He also expressed optimism on the zinc outlook, forecasting domestic consumption of close to 950,000 tons, 90,000 tons more than was used last year.

TITANIUM . . . The government is ready to sign a contract authorizing E. I. DuPont de Nemours Co. to build a titanium plant at New Johnsonville, Tenn. General Services Administration has been negotiating with DuPont for 15 months on arrangements for the plant. Last August, the company entered into an initial GSA contract to draw up engineering plans for the facility.

Information on estimated cost of the plant is not yet adequate, says GSA Administrator Mansure. In addition, Justice Dept. and Office of Defense Mobilization must approve the final contract terms.

Justice Dept. will decide whether operation of the plant by DuPont will be free of any monopolistic taint.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

	F	Plate		
Alloy	0.032 in.	0.081 in.	0.136- 0.249 in.	0.250- 3.000 in.
1100, 3003. 8004. 8082. 3024-O, -OAL.	89.1 44.0 46.7	37.1 39.8 41.9	35.9 38.1 40.2	35.5 37.6 39.3
7078-O, -OAL	60.8	40.8	39.3	39.4

Extruded Solid Shapes: Shape factors 1 to 4, 38.7¢ to 36.7¢; 12 to 14, 39.4¢ to 31.04; 24 to 26, 42.2¢ to 51.36; 36 to 38, 49.8¢ to 51.97. Red. Reund: Rolled, 1.044-4-6 in. 1100-F, 48.6¢ to 40.1¢; cold finished, 0.375-3.499 in., 1100-F, 47.9¢ to 42.4¢. Reund: Round: Round: Round: 2011-T3, ½-11/32 in., 63.5¢ to 50.1¢; ½-1½ in., 49.9¢ to 46.9¢; 1 9/16-3 in., 45.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Colled, 0.051-0.374 in., 1100

B000 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 1100, 47.1¢ to 38.8¢; 8082, 56.7¢ to 44.4¢; 2017-T3, 64.3¢ to 44.7¢; 6081-T4, 59.5¢ to 44.1¢.

Extruded Tubing: Rounds, 6083-T5, OD 1½-2 in., 44.4¢ to 64.8¢; 2-4 in., 40.3¢ to 54.6¢; 4-6 in., 40.8¢ to 68.2°, 5-9 in., 41.4¢ to 52.1¢.

Rosfing Sheet: Flat, per sheet, 0.032-in., 42¾ x 60-in., \$2.99\$; x 96-in., \$4.801; x 120-in., \$4.602; x 144-in., \$7.202. Coiled sheet, per lb, 0.019 in. x 28 in., 30.9¢.

Magnesium

(F.o.b. mill, freight allowed)

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 56¢; 3/16 in., 67¢; ½ in., 69¢; 0.064 in., 73¢; 0.032 in., 94¢.

Specification grade higher. Base 30,000 lb.

Extruded Round Red: M. diam ¼ to 0.311
in., 77¢; ½ to % in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to % in. diam, 10,000 lb; % to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft for perimeters less than size in-dicated: 0.10 to 6.11 lb. 3.5 in., 65.8¢; 0.22 to 0.25 lb. 5.9 in., 62.3¢; 0.50 to 0.59 lb. 8.6 in., 59.7¢; 1.8 to 2.55 lb. 19.5 in., 56.8¢; 4 to 6 lb. 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb. 10,000 lb: ½ to 1.80 lb. 20,000 lb: 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/18 in., 51.4¢; 5/16 to % in., 31.4¢; 5/16 to % in., 31.4; 5/16 to

(10,000 lb base, f.o.b. mill)
Commercially pure and alloy grades: Sheets
and strip, HR or CR, \$15; Plate, HR, \$12;
Wire, rolled and/or drawn, \$10; Bar, HR or
forged, \$9; Forgings, \$9.

Nickel, Monel, Inconel

(Base prices, f	.o.b. mill)	
"A" Nicke	l Monel	Inconel
Sheet, CR 102	78	99
Strip, CR 102	87	125
Rod, Bar, HR 87	69	93
Angles, HR 87	69	93
Plate, HR 97	82	9.5
Seamless Tube. 122	108	153
Shot, Blocks	65	

Copper, Brass, Bronze

(Freight	included	on	500	
Copper	Sheet 49.79		abo	Shapes 51.36
Copper, h-r			.11	
Copper, drawn.			.36	****
Low brass			.29	
Yellow brass .			.21	* * * * *
Red brase			.38	23.44
Naval brass			.49	43.75
Leaded brass			.36	41.41
Com. bronze		5.0	1.02	
Mang. bronze		44	.02	47.58
Phos. bronze			.62	
Muntz metal			.16	43.40
Ni silver, 10 pct			.58	
Beryllium coppe	er, CR, 1	.9%	Be,	Base
2000 lb, f.o.b.				
Strip				\$1.7
Rod haw w	rive			1 61

PRIMARY METALS

(Cents per lb, unless otherwise noted) Aluminum ingot, 99+%, 10,000 lb, freight allowed
Alumínum pig
Beryllium aluminum 5% Be, Dollars per lb contained Be\$72.75
Bismuth, ton lots \$3.25
Cobalt, 97-99% (per lb) \$2.60 to \$2.67
Copper, electro, conn. valley
Iridium, dollars per troy os. \$110 to \$120 Lead, St. Louis
Lead, New York
ingot
Mercury, dollars per 76-lb flask, f.o.b. New York \$222 to \$324 Nickel electro, f.o.b. N. Y. warehouse 67.67
Nickel electro, f.o.b. N. Y. warshouse 67.67 Nickel oxide sinter, at Copper
Cliff, Ont., contained nickel 60.75 Palladium, dollars per troy os \$18 to \$20
Platinum, dollars per troy os \$78 to \$80 Silver, New York, cents per troy os. 85.25
Tin, New York
Zinc, East St. Louis
Zirconium copper, 50 pct \$6.20

REMELTED METALS

		Bro	155	h	q	rt.			
(Centa	per	lb	de	liv	ar	ed.	car	load	a)
85-5-5-5 in	got								
No. 115									34.00
No. 120									33.50
No. 123									33.00
80-10-10 in	Rot								
No. 305									38.00
No. 315									35.71
88-10-2 ing	tot								
No. 210									47.71
No. 215									44.25
No. 245									39.21
Vellow ing	30								
No. 405									29.70
Manganese									
No. 421		, .					441		32.20
						190			
(Conts pe	er Ih	de	l'd	20	1.00	0.0	lb a	nd o	ver)
95-5 alumi									
0.20 000	DAR	77.0	w				- 5	11.50	-32 E

(Cents per lb del'd 20,000 lb and over)
95-5 aluminum-silicon alloys
0.30 copper, max
0.50 copper, max
Piston alloys (No. 122 type) 30.00-21.50
No. 12 alum. (No. 2 grade) 29.25-30.25
108 alloy
195 alloy
13 alloy (0.60 copper max.) 31.25-32.25
ASX-679 30.00-31.00

Steel deoxidizing aluminum, notch-bar

	granulated	or	shot		
Grade	1-95-971/4%			31.	50-32.50
Grade	2-92-95%			30.	50-31.50
Grade	m no nmer			29.	75-30.50
Cleade	A-85-90cc			2.8	75 - 29.56

FLECTROPLATING SUPPLIES

PPECIFOL PWILLIA SOLLE	
Anodes	
(Cents per lb, freight allowed, 5000 I	b lota)
Copper	
Cast, oval, 15 in. or longer	44.92
Electrodeposited	29.71
Flat rolled	45.42
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.23
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	20.50
Cadmium	\$1.70
Silver 999 fine, rolled, 100 oz. lots	
per troy os., f.o.b. Bridgeport, Conn.	94%
Chemicals	
(Cents per lb, f.o.b. shipping poi	mte)
Copper cyanide, 100 lb drum	63.00
Copper sulphate, 99.5 crystals, bbl	12.80
Nickel salts, single or double, 4-100	

Nickel salts, single or double, 4-100 lb bags, frt. allowed Nickel chloride, 300 to 400 lb. Sliver cyanide, 100 os. lots, per os. Sodium cyanide, 96 pet domestic 200 lb drums. Zinc cyanide, 100 lb drum • Effective Jan. 2. 81.26° 43.50° 75 %

SCRAP METALS

Brass Mill Scrap

(Cents ;	per pound	, add 14 pe	over)
anspin	UNIO 0) 24		Turninge
Copper		29	38 14
Yellow bri	0.86	21.76	20 %
Red brass		25 1/4	24%
Comm. bro	onse	26%	25 %
Mang. bro	nse	20%	19 %
Yellow bri	ans rod en	ds 21%	4126

Custom Smelters Scrap (Cents per pound carload lots, delivered to refinery)

	la.	not M	_	L.				æ	_	_	
* Di	гу сорр	or con	te	9.81	t.						
* Refin	ery bra	1.88						0	٥	ь.	28
Light	copper										20 %
No. 3	copper	wire		0 0		0	0			0	32
No. 1	copper	wire					0			0 1	33 %

Ingot Makers Scrap	
(Cents per pound carload lots, deliv	ered
No. 1 copper wire 22 ½ — No. 2 copper wire 31 — Light copper 29 — No. 1 composition No. 1 composition No. 1 comp. turnings	32
Rolled brass	21 79
	20 ½ 19

Dealers' Scrap (Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass
No. 1 heavy copper and wire, 30 -30 1/4
No. 2 heavy copper and wire. 29 -29 1/2
Light copper
New type shell cuttings 27 -27 1/2
Auto radiators (unsweated) 19 -19 1/2
No. 1 composition 24 -24 1/2
No. 1 composition turnings. 23 -23 1/2
Unlined red car boxes 18 1/2-19
Cocks and faucets 20 -20 1/2
Mixed heavy yellow brass 17 1/2-18
Old rolled brass 18 -18 1/2
Brass pipe 20 -20 %
New soft brass clippings 211/2-22
Brass rod ends 19 -20
No. 1 brass rod turnings 181/2-19

Aluminum	
Alum, pistons and struts	111/2-121/2
Aluminum crankcases	15 -16
1100 (28) aluminum clippings	18 -18 16
Old sheet and utensils	15 1/2 16
Borings and turnings	9 1/2 10
Misc. cast aluminum	141/2-10
2024 (24a) clippings	15 —15 16
Tine	

New zinc cuppings	
Old zinc	
Zine routings 3%-3%	
Old die cast scrap 31/4 31/4	
Nickel and Monel	
Pure nickel clippings 57 -60	
Clean nickel turnings 40 -43	
Nickel anodes 57 60	
Nickel rod ends 5760	
New Monel clippings 26 -28	
Clean Monel turnings 90 91	

Clean nickel turnings 40 -43	3
Nickel anodes 57 -60)
Nickel rod ends 57 -60)
New Monel clippings 26 -28	3
Clean Monel turnings 20 -21	l
Old sheet Monel 25 -26	i
Nickel silver clippings, mixed. 16 -17	7
Nickel silver turnings, mixed. 14 -15	à
Lead	
Soft scrap lead 1114-11	19

Batteries, acid	free (dry						4.0
	Mag						
Segregated sol	ids		p 8		٠		18 1/4 19
Castings		. + 1	= 25	6 1	*	6	11.78-10

Block tin	70 -75
No. 1 pewter	50 56
No. 1 auto babbitt	4.5
Mixed common babbitt	12 -134
Solder joints	17
Siphon tops	46
Small foundry type	16%-16%
Monotype	15 -15%
Lino, and atereotype	
Electrotype	12%-124
Hand picked type shells	2 1/2 10
Lino, and stereo, dross	2.74
Electro dross	

	STEEL	BILLET			PIL-				. mill, in cents p	as io., unicie u	ADEF WISE IN	ceo. Eatre	аругу.	
	RICES		SLABS	OMS,	ING		SHAPES				STR	1P		
M	(Effective ar. 15, 1955)	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- ruffed	Cold- telled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
T	Bethlehem, Pa.			\$86.00 B3		4.30 B3	6.45 B3	4.30 B3						
	Buffalo, N. Y.	\$64.00 B3	\$78.00 B3, R3	\$86.00 B3, R3	5.075 B3	4.30 B3	6.45 B3	4.30 B3	4.05 B3,R3	5.75 R7	6.15 B3	8.425 B3	*	
	Claymont, Del.													
T	Contenville, Ps.													
-	Conshohecken, Pa.								4.10 .42	5.80 .42	6.15 /12			
	New Bedford, Mass.									6.20 R6				
EAST	Johnstown, Pa.	\$64.00 B3	\$78.00 B3	\$86.00 B3		4.30 B3	6.45 B3		4.05 B3					
M .	Fairlass, Pa.													
1	New Haven, Conn.									6.20 DI 6.50 A5				
4	Phoenizville, Pa.					3.95 P2		4.30 P2						
-	Sparrowa Pt., Md.								4.05 B3	5.75 B3	6.15 B3	8.425 B3		
	Bridgeport, Wallingford, Conn.	\$69.00 NE	\$83.00 NB						4.35 N8	6.20 W/			7.00 NB	
1	Pawtucket, R. I. Worcester, Mass.									6.30 N7 6.60 A5				12.75 A5 12.80 N7
	Alises, III.								4.225 L1	1.00 A)				12.00 /11
						-	-	-			-		-	
	Ashland, Ky.		*** ** **	*** ** B7				-	4.05 /17	-	_	-		10.45.54
	Canton-Massillon, Dover, Ohio		\$80.00 R3	\$86.00 R3, T5										12.45 G4
	Chicago, III.	\$64.00 UI	\$78.00 R3, UI,W8	\$86.06 U1, W8,R3	5.075 U1	4.25 UI, IN'8	6.40 UI, YI	4.25 UI	4.05 A1,N4 Will	S.85 A1				
	Cleveland, Ohio									5.75 A5.J3		8.60 /15		12.45 A5
	Detroit, Mich.			\$86.00 R5					4.15 G3,M2	S.85 D1,D2, G3,M2,P11	6.25 G3	8.70 D2, G3		
ST	Duluth, Minn.													-
MIDDLE WEST	Gary, Ind. Harbor, Indiana	\$64.00 UI	\$78.00 U/	\$86.00 UI, YI	5.075 /3	4.25 /3, U/	6.40 UI. 13		4.05 I3, UI,YI	5.85 /3	6.15 UI. 13, YI	8.60 Y/	6.70 UI. YI	
a	Sterling, III.								4.15 N4					
2	Indianapelia, Ind.								-	5.90 C5	-	-		
	Newport, Ky.	-		-	-	1			-		-		6.70 Y5	
	Middletown, Ohio						-			5.75 A7		-	-	
	Niles, Warren, Ohio		-	-				-	4.05 S1,R3	\$.7\$ SI,R3,	6.15 SI,	8.60 SI,	6.70 SI	12.45 SI
	Sharon, Pa.							-	_	T4	R3	R3		
	Pittsburgh, Pa. Midland, Pa. Butlor, Pa.	\$64.00 UI.	\$78.00 /3, UI,CII	\$86.00 UI, CII	5.075 UI	4.25 J3, UI	6.40 J3, UI	4.25 UI	4.01 /6	\$.7\$ B4, J3			6.70 S9	12.45 .59
	Partsmouth, Ohio								4.05 P7	5.75 P7				
	Weirton, Wheeling, Follanchoo, W. Va.					4.25 W3			4.05 W3	\$.75 F3,W3	6.15 W3	8.60 W3		
	Youngstewn, Ohio		\$78.00 C/0	\$86.00 Y/, C/U		4.25 Y/	6.40 Y/		4.05 UI, YI	5.75 Y1,C5	6.15 UI. YI	8.60 Y/	6.76 UI, YI	12.45 C
_	Fontana, Cal.	\$72.00 K/	\$84.00 K1	\$105.00 K/		4.90 K1	7.05 K/	5.25 K/	4.825 K1	7.65 K/	7.25 KI		8.10 K/	14.55 K
	Geneva, Utah		\$78.00 C7			4.25 C7	6.40 C7							
	Kanasa City, Mo.					4.30 S2	6.45 52				6.40 52		6.95 S2	
WEST	Los Angeles, Torronco, Cal.		\$87.50 B2	\$106.00 B	2	4.95 B2, C7	7.10 B2		4.80 B2,C7	7.80 CI				
	Minnegua, Cole					4.70 C6			5.15 C6					
	Portland, Ore.					5.00 02								
	San Francisco, Nilos Pittsburgh, Cal.		\$87.50 B2			4.90 B2 4.95 P9	7.05 B2		4.80 B2,C7					
	Seattle, Wash.		\$91.50 B2			5.88 B2	7.15 B2		5.05 BJ, P/2					1
	Atlanta, Ga.								4.25 /48					
SOUTH	Fairfield, Ala. City, Birmingham, Ala.	\$64.00 72	\$78.00 77			4.25 C/6, R3, T2	6.40 72	Sets.	4.05 R3. T2C16		6.15 72			
	1													-

	STEEL			entify produce							WIRE			BLACE
P	RICES				S	HEETS					ROD	TINPI	LATE	PLATE
M	(Effective ar. 18, 1988)	Hot-rolled 18 ga. & hvyr.	Cold- rolled	Galvanized 10 ga.	Enamel- ing 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb, base box	Hollowwar Enameling 29 ga.
	Bathlahem, Pa.													
	Buffalo, N. Y.	4.05 B3	4.95 B3				6.10 B3	7.50 B3			4.675 W6	† Special co terne deduct	95c from	
	Claymont, Del.		-	-								1.25-lb coke price. Can-n	hase bez saking quality to 128 lb.	
	Coatesville, Pa.											deduct \$2.26	from 1.25-lb.	
	Canahohocken, Pa.	4.10 /42	5.00 .42				6.15 AZ					* COKES:	1.50-lb.	
	Harrisburg, Pa.											ELECTRO 25¢; 0.75-lb.	0.50-lb. add	
EAST	Hartford, Conn.											1.00-lb. add ential 1.00 li	\$1,10. Differ-	
2	Johnstown, Pa.										4.675 B3	add 85c.		
	Fairless, Pa.	4.10 UI	5.00 UI				6.15 UI	7.55 UI				\$8.90 U1	\$7.60 UI	
	New Haven, Conn.													
	Phoenizville, Pa.													-
	Sparrows Pt., Md.	4.05 B3	4.95 B3	5.45 B3			6.10 B3	7.50 B3	8.20 B3		4.775 B3	\$8.90 B3 '	\$7.60 B3	
	Worcester, Mass.										4.975 .45			
	Trenten, N. J.		-	-	-			-	-	-	-		-	-
-	Alton, III.										4.85 <i>L1</i>			
	Ashland, Ky.	4.05 .47	-	5.45 .47	5.375 A7		-	-	-	-	4.00 2.7		-	-
	Canton-Massillon,			5.45 R/,			-			5.175 R1				
	Dever, Ohio			R3										-
	Chicago, Joliet, III.	4.05 A1,					6.10 UI				4.675 A5, N4,R3			
	Sterling, III.										4.775 N4			
	Cleveland, Ohio	4.05 J3, R3	4.95 J3, R3		5.375 R3		6.10 J3, R3	7.50 J3, R3			4.675 .45			
/EST	Detroit, Mich.	4.15 G3,	5.05 G3	-	-	-	6.20 G3	7.60 G3	-	-				
		M2						1.60		_				
	Newport, Ky.	4.05 N5	4.95 N5	5.45 N5										
E WEST	Gary, Ind. Harbor, Indiana	4.05 13, U1,Y1	4.95 /3, UI,YI	5.45 U1,	\$.37\$ 13, UI	S.8S U/	6.10 UI. 13, YI	7.50 UI, YI			4.675 Y/	\$8.80 I3, UI, YI	\$7.50 I3. UI.YI	6.28 UI, YI
MIDDLE	Granite City, III.	4.25 G2	5.15 G2	5.65 G2	5.575 G2								\$7.40 G2	6.30 GZ
Z	Kokomo, Ind.	4.15 C9		5.55 C9						5.20 C9	4.775 C9			
	Mansfield, Ohio					5.85 E2				5.175 E2				
	Middletown, Ohio		4.95 /17		\$.375 A7	5.85 .47			-	_		****	****	-
	Niles, Ohio Sharon, Pa.	4.05 SI,R3 5.30 N3	4.95 R3 5.975 N3	5.45 N3	6.725 N3	5.85 N3	6.10 SI,R3	7.50 R3				\$8.80 R3	\$7.50 R3	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.05 J3. U1,P6	4.95 J3, UI,P6	5.45 UI	5.375 UI		6.10 f3, UI	7.50 J3, UI	8.20 UI		4.675 A5 4.875 P6	\$8.80 J3, UI	\$7.50 J3. UI	6.20 UI
	Pertamouth, Ohio	4.05 P7	4.95 P7								4.675 P7			
	Weirton, Wheeling, Follansboe, W. Va.	4.05 W3,	4.95 W3,	5.45 W3, W5		S.85 W3, W5	6.10 W3	7.50 W3				\$8.80 W3,	\$7.50 W1,	6.20 F3,
	Youngstown, Ohio	4.65 UI, YI	4.95 Y/	W3	5.375 Y/	W3	6.10 UI, YI	7.50 Y/			4.675 Y/	W5	W-5	W5
_	Fontana, Cal.	4.825 K1	6.05 K/		-		6.875 K1	8.55 K/			5.475 K1		-	
	Geneva, Utah	4.15 C7	0.00 M.1			-	V.012711	0.00 %1	-	-	2.413/6/	-	-	-
	Kansas City, Mo.			-			-	-	-	-	4.925 .52	-	-	-
-	Los Angeles, Torrance, Cal.										5.475 C7,			-
WEST				-	-	-	-	-	-	-	1025.00	-	-	-
-	Minnequa, Colo.	4.75.67	5.90 C7	6.20 C7	-	-	-	-	-	-	4.925 C6	\$0.55.02	98 95 67	-
	San Francisco, Niles Pittsburg, Cal. Seattle, Wash.		3.90 (.7	6.26 (7							5.325 C7	\$9.55 C7	\$8.25 C7	-
-	Atlanta Ca	-							_					
ВО ОТН	Atlanta, Ga. Fairfield, Ala. Alabama City, Ala.	4.05 R3, T2	4.95 72	5.45 R3, 72			6.10 T2			5.35 R3	4.675 T2, R3	\$8.90 72	\$7.60 T2	
38	Houston, Tex.			-							4.925 52			

	-		outs roctural bu	oddicare mited to	acy at this or			, in cents per lb.,	dina van	was 11000000		_
Harrisburg, Pa. Harrisord, Conn. Johnstown, Pa. Fairless, Pa. Newark, N. J. Camden, N. J. Bridgsport, Putnam, Conn. Sparous Pt., M. Palmer, Worcest Readville, Mansfield, Mas Altan, Ill. Ashland, Newpor				BAR	ts				PLA	TES		WIRE
		Carbon Steel	Reinforc-	Cald Finished	Alloy Hat- rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfgr's, Bright
1	Bethlehem, Pa.				5.075 B3	6.625 B3	6.45 B3					
1	Buffalo, N. Y.	4.30 B3,R3	4.30 B3,R3	5.45 B5	5.075 B3,R3	6.625 B3,B5	6.45 B3	4.225 B3,R3			6.45 B3	5.75 W6
	Claymont, Del.							4.225 C4		5.80 C4		
12	Contesville, Pa.							4.225 L4		5.80 <i>L.</i> 4	6.45 L4	
1	Conshohocken, Pa.							4.225 AZ	5.275 AZ		6.45 A2	
	Harrisburg, Pa.							4.225 C3	5.275 C3			
	Hartford, Conn.			5.90 R3		6.925 R3						
283	Johnstown, Pa.	4.30 B3	4.30 B3		5.075 B3		6.45 B3	4.225 B3		5.80 B3	6.45 B3	5.75 B3
	Fairless, Pa.	4.45 U!	4.45 UI		5.225 UI							
ı	Newark, N. J.			S.85 W/0		6.80 W10						
	Camdon, N. J.			S.85 P10								
1	Bridgeport, Putnam, Const.	4.55 NB		5.95 W/O	5.225 N8			4.475 N8_				
	Sparrows Pt., M4.		4.30 B3					4.225 B3		5.90 B3	6.45 B3	5.85 B3
	Palmor, Worcester, Readville, Manafield, Mass.			5.85 W// 5.95 B5,C/4		6.925 A5,B5						6.05 A5, W6
-	Altan, III.	4.50 <i>L.1</i>										5.925 L1
	Ashland, Newport, Ky							4.225 A7,N5		5.80 N5		
		4.40 R3		5.40 R2,R3	5.075 R3, T5	6.625 R2,R3,		4.225 E2		-		
	Manafield, Ohio			-		T5		4 995 111 11/9	E 205 1/1	F 40 f //	0.45.571	5.75 A5,
	Chicago, Juliet, III.	4.30 UI, N4,W8,R3	4.30 N4,R3	5.46 A5,W10, W8,B5,L2	\$.07\$ U1,R3, W8	6.625 A5,W8, W10,L2,B5		4.225 UI,W8, 13,A1,R3	5.215 01	5.80 U/	6.45 UI	R3,N4,W
	Cleveland, Ohio	4.30 RJ	4.30 R3	\$.40 A5,C13		6.625 A5,C13		4.225 J3,R3	\$.27\$ J3		6.45 J3,R3	5.75 A5, C13
	Detroit, Mich.	4.40 G3 4.45 R5		5.48 R5 5.60 B5,P8 5.65 P3	\$.075 R5 \$.175 G3	6.625 R5 6.825 B5,P3, P8	6.55 G3	4.325 G3			6.55 G3	
WEST	Duluth, Minn.											5.75 A5
	Gary, Ind. Harbor, Crawfordsville	4.30 B, UI, VI	4.30 IS, UI, YI	5.40 M5,R3	\$.07\$ 13, U1, Y1	6.625 M3, R3	6.45 U1,13,	UI,YI	5.275 /3	5.80 UI. YI	6.45 U1,13, Y1	5.85 M4
MIDDLE	Granite City, III.						-	4.425 G2			-	7 47 500
N	Kokomo, Ind.								-	_	-	5.85 C9
	Storling, III.	4.40 N4	4.46 N4									5.85 N4
	Niles, Ohio Sharon, Pa.	4.30 R5					6.45 R3	4.225 S1,R3		5.90 SI	6.45 51	7 97 46 I
	Pittsburgh, Pa. Midland, Pa.	4.30 J3, UI, CII	4.30 J3, UI	\$.40 A5,C8, C11,J3, W10,B4,R3	5.075 U1,C11	6.625 A5,C1 W10,C8,R3	6.45 J3, UI	4.225 J3, UI	5.275 UI	5.80 UI	6.45 J3, UI	5.75 A5, J P6
	Portsmouth, Ohio											5.75 P7
	Weirton, Wheeling, Follanshee, W. Va	4.30 H/3						4.225 W3, W5				
	Youngstown, Ohio	4.30 UI, YI, CIO, R3	4.30 UI, YI,	5.40 F2, Y1, C10	5.075 U1, Y1 C10	6.625 Y1,C	0 4.45 UI, YI	_		5.80 Y/	6.45 Y/	5.75 Y/
	Emoryville, Cal.	5.05 /5	5.05 /5									
	Fontana, Cal.	5.00 KI	5.00 K/		6.125 K/		7.70 KI	4.875 K1		6.45 K1	7.15 K/	
	Geneva, Utah							4.225 C7			6.45 C7	
	Kansas City, Ma.	4.55 S2	4.55 SZ		5.325 S2		6.70 S2					6.00 52
WEST		5.00 B2,C7	\$.00 B2,C7	6.85 R3	6.125 B2		7.15 B2					6.70 B2
-	Minneque, Colo.	4.75 C6	4.75 C6			1		5.075 C6				6.00 C6
	Portland, Ore.	5.05 02	5.05 02									
	San Francisco, Nils Pittaburg, Cal.	5.05 B2	5.00 C7,P9 5.05 B2				7.20 B2					6.76 C7
	Seattle, Wash.	5.85 B2,P1. N6	2, 5.65 B2,P1	2			7.20 B2	5.125 B2		6.70 B2	7.35 B2	
-	Atlanta, Ga.	4.50 /46	4.50 .48									5.95 48
SOUTH				6,			6.45 72	4.225 T2,R	3		6.45 77	5.75 R3 T2
S	Houston, Ft. Worth	4.85 52	4.55 S2		5.325 S2		6.70 52	4.55 L3 4.275 S2		5.85 S2	6.50 S2	6.00 S2

P10 Precision Drawn Steel Co., Camden, N. J. P11 Production Steel Strip Corp., Detroit

Reeves Steel & Mfg. Co., Dover, O.

R2 Reliance Div., Eaton Mfg. Co., Massillon, O.

R4 Roebling Sons Co., John A., Trenton, N. J. R5 Rotary Electric Steel Co., Detroit

Rodney Metals, Inc., New Bedford, Mass.

Simonds Saw & Steel Co., Fitchburg, Mass.

Superior Drawn Strel Co., Monaca, Pa.

71 Tonawanda Iron Div., N. Tonawanda, N. Y.

TI Tennessee Products & Chem. Corp., Nashville

U2 Universal Cyclops Steel Corp., Bridgeville, Pa.

U3 Ulbrich Stainless Steels, Wallingford, Conn.

U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.

W2 Washington Steel Corp., Washington, Pa.

W3 Weirton Steel Co., Weirton, W. Va.

W4 Wheatland Tube Co., Wheatland, Pa.

W6 Wickwire Spencer Steel Div., Buffalo

W7 Wilson Steel & Wire Co., Chicago

W8 Wisconsin Steel Co., S. Chicago, III. W9 Woodward Iron Co., Woodward, Ala,

W10 Wycoff Steel Co., Pittsburgh

W5 Wheeling Steel Corp., Wheeling, W. Va.

Superior Steel Corp., Carnegie, Pa.

72 Tennessee Coal & Iron Div., Fairfield

Thomas Strip Div., Warren, O.

77 Texas Steel Co., Fort Worth

75 Timken Steel & Tube Div., Canton, O.

UI United States Steel Corp., Pittsburgh

Tremont Nail Co., Wareham, Mass.

P8 Plymouth Steel Co., Detroit

P9 Pacific States Steel Co., Niles, Cal.

P12 Pacific Steel Rolling Mills, Seattle

R3 Republic Steel Corp., Cleveland

R7 Rome Strip Steel Co., Rome, N. Y.

52 Sheffield Steel Corp., Kansas City

55 Sweet's Steel Co., Williamsport, Pa. Standard Forging Corp., Chicago

Shenango Furnace Co., Pittsburgh

S1 Sharon Steel Corp., Sharon, Pa.

54

S6

SR

.59

Key to Steel Producers

With Principal Offices

- Acme Steel Co., Chicago
- 42 Alan Wood Steel Co., Conshohocken, Pa.
- 43 Allegheny Ludlum Steel Corp., Pittaburgh
- American Cladmetals Co., Carnegie, Pa. A4
- American Steel & Wire Div., Cleveland
- 46 Angell Nail & Chaplet Co., Cleveland
- A7 Armco Steel Corp., Middletown, O.
- Atlantic Steel Co., Atlanta, Co. 48
- Babcock & Wilcox Tube Div., Beaver Falls, Pa. mi
- Bethlehem Pacific Coast Steel Corp., San Francisco 82
- Bethlehem Steel Co., Bethlehem, Pa.
- Ba Blair Strip Steel Co., New Castle, Pa.
- BS Bliss & Laughlin, Inc., Harvey, Ill.
- C1 Calstrip Steel Corp., Los Angeles C2 Carpenter Steel Co., Reading, Pa.
- C3 Central Iron & Steel Co., Harrisburg, Pa. CA
- Claymont Products Dept., Claymont, Del,
- Cold Metal Products Co., Youngstown, O. CS Colorado Fuel & Iron Corp., Denver C6
- Columbia Geneva Steel Div., San Francisco
- Cli Columbia Steel & Shafting Co., Pittsburgh
- C9 Continental Steel Corp., Kokomo, Ind.
- C10 Copperweld Steel Co., Pittsburgh, Pa.
- C11 Crucible Steel Co. of America, New York
- C12 Cumberland Steel Co., Cumberland, Md.
- C13 Cuyahoga Steel & Wire Co., Cleveland
- C14 Compressed Steel Shafting Co., Readville, Mass.
- C15 G. O. Carlson, Inc., Thorndale, Pa.
- C16 Connors Steel Div., Birmingham
- Detroit Steel Corp., Detroit
- D2 Detroit Tube & Steel Div., Detroit D3 Driver Harris Co., Harrison, N. J.
- Dickson Weatherproof Nail Co., Evanston, III. D4
- D5 Henry Disston & Sons, Inc., Philadelphia
- Eastern Stainless Steel Corp., Baltimore
- E2 Empire Steel Co., Mansfield, O.
- Firth Sterling, Inc., McKeesport, Pa.
- Fitzsimmons Steel Corp., Youngstown Follansbee Steel Corp., Follansbee, W. Va. F3
- GI Globe Iron Co., Jackson, O.

- Granite City Steel Co., Granite City, Ill.
- Great Lakes Steel Corp., Detroit G3
- G4 Greer Steel Co., Dover, O.
- HI Hanna Furnace Corp., Detroit
- 12 Ingersoll Steel Div., Chicago
- Inland Steel Co., Chicago
- 14 Interlake Iron Corp., Cleveland
- JI Jackson Iron & Steel Co., Jackson, O.
- Jessop Steel Corp., Washington, Pa. Jones & Laughlin Steel Corp., Pittsburgh 12
- 13
- Joslyn Mfg. & Supply Co., Chicago 15 Judson Steel Corp., Emeryville, Calif.
- KI Kaiser Steel Corp., Fontana, Cal.
- K2 Keystone Steel & Wire Co., Peoria
- K3 Koppers Co., Granite City, III.
- L1 Luclede Steel Co., St. Louis
- La Salle Steel Co., Chicago
- Lone Star Steel Co., Dallas
- L4 Lukens Steel Co., Coatesville, Pa.
- MI Mahoning Valley Steel Co., Niles, O.
- M2 McLouth Steel Corp., Detroit
- M3 Mercer Tube & Mig. Co., Sharon, Pa. M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
- M5 Monarch Steel Div., Hammund, Ind.
- M6 Mystic Iron Works, Everett, Mass.
- NI National Supply Co., Pittsburgh
- National Tube Div., Pittsburgh N2
- Niles Rolling Mill Div., Niles, O.
- N/4 Northwestern Steel & Wire Co., Sterling, III.
- NS.
- Newport Steel Corp., Newport, Ky. Northwest Steel Rolling Mills, Seattle N6
- Newman Crosby Steel Co., Pawtucket, R. I.
- N8 Northeastern Steel Corp., Bridgeport, Conn.
- 01 Oliver Iron & Steel Co., Pittsburgh
- 02 Oregon Steel Mills, Portland
- PI Page Steel & Wire Div., Monessen, Pa.
- P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
- Pilgrim Drawn Steel Div., Plymouth, Mich.
- Pittsburgh Coke & Chemical Co., Pittsburgh
- P5 Pittsburgh Screw & Bolt Co., Pittsburgh
- P6 Pittsburgh Steel Co., Pittsburgh Portsmouth Div., Detroit Steel Corp., Detroit P7

WII Worcester Pressed Steel Co., Worcester, Mass.

YI Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.e.b. mills. Base price about \$200 per not ton.

							BUTTY	VELD										SEAM	LESS			
	1/2	in.	3/4 1	in.	11	n.	11/4	In.	11/2	In.	2 1	n.	21/2	3 In.	2	In.	21/2	In.	3 1	ln.	31/2	4 In.
	Blk.	Gal.	Bik.	Gal.	Bik.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik,	Gal.
STANDARD T. & C. Sparrows Pt. B3	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30 75	16.25	12.25	i6.0								
Youngstown R3	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0								
Footana K/	10.75	+4.5		+0.5	16.25	3.0	18.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0								I man ka
Pittaburgh J3	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Alten III. L1	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	38.75	16.25	32.25	16.0								
Sharen M3	23.75	6.5	26.75	12.5	29.25	14.0	31.75	14.75	32.25	15.75	32.75	16.25	34,25	15.0								
Fairless N2. Pittsburgh N1	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32 25	17.75	32.75	18.25	34.25	18.0	13.5	+1.56	17.5	0.75	20.0	3.25	21.5	4.75
Wheeling W5	23.75	8.5	26.75	12.5	29.25		31.75	16.75	32,25	17.75	32,75	18,25	34.25			1 6700	****	2110		2100		
Wheatland W4	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25									
Youngstown Y/	23.75	8.5	26.75		29.25		31.75	16.75	32.25	17.75	32.75	18.25	34.25		13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Indiana Harbor Y/	22.75	7.5	25.75		28.25		30.75	15.75	31.25	16.75	31.75	17.25			13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Lorain N2	23.75	8.5	26.75	12.5	29.25	10.0	31.73	10.75	34.23	11.13	34.13	10.63	34.23	10.0	13.3	11.00	11.2	0.10	20.0	3.20	41.0	2.0
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. Bi	25.25		29.25		31.25		31.75	17.75	32.25	18.75	32.75											
Youngstown R3	27.25		31.25		33.25	21.0	33.75	19.75 17.75	34.25	20.75	34.75	21.25		20.0		1						
Fairless N2 Fentana K/	25.25	11.5	29.25 18.25	15.5	20.25	19.0	20.75	17.75	21 25	18.75	32.75	19.25	22,25	10.0								
Pittsburgh /3	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0		19.0	3.25	21.5	5.75	26.5	10.7
Alten, III. LI	25.25		29.25		31.25		31,75	17.75	32.25	18.25	32.75	19,25	33.25	18.0	1							
Sharon M3	27.25	13.5	31.25		33.25		33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0			12010	10140	143751	127.22	45.5	15514
Pittsburgh N1	27.25		31.25		33.25		33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0		19.0	3.25	21.5	5.75	26.5	10.7
Wheeling W5	27.25		31.25		33.25		33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0				10000	111111		mo	1000
Wheatland We	27.25		31.25		33.25		33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0		19.0	3.25	21.5	5.75	26.5	10.7
Indiana Harbor Y/	26.25		30.25		32.25		32.75		33.25	19.75	33.75	20.75	34.25	19.0	14.0			2100				
Lorain N2	27.25		31.25			21.0	33.75		34.25	20.75	34.75	21.75	35.25	20.0	14.0		19.0	3.25	21.5	5.75	24.5	10.7

Threads only, buttweld and seamless 2½ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt. higher discount. Buttweld jobbers discount, 5 pct. Galvanized discounts based on zinc price range of ever 9¢ to 11¢ incl. per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ½ and 1-in., 2 pt.; 1½, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of ever 1¢ to 13¢ would lower discounts; zinc price in range of ever 7¢ to 9¢ would increase discounts. East St. Louis zinc price new 11.50¢ per lb.

(Effective Mar. 15, 1955)

RAILS, TRACK SUPPLIES

F.o.b. Mill Coots Per Lb	No. 1 Std. Rada	Light Rails	Joint Bers	Track Spikes	Scrow Spikes	Tie Plates	Track Balts Treated
Bossomer UI So. Chicage R5 Ecneley T7 Fairhold T2 Gary UI Fairhold T2 Johnstown B3 Johnstown B3 Johnstown B3 Minnoque C6 Fittsburgh F7 Ittsburgh F7 Ittsburgh F8 Soeattle B2 Steuthere Y1 Torrance C7 Williamapert S7 Youngsiewn R8	4.45 4.45 4.45 4.45	S. 35 S. 35 S. 35 S. 35 S. 35 S. 35	5, 425 5, 425 5, 425 5, 425 5, 421	7.30 7.30 7.30 7.30 7.30 7.30 7.30 7.30	11.00	S. 275 S. 275 S. 275 S. 271 S. 271 S. 421 S. 421	11.50 11.50 11.50 11.50 11.50

ELECTRICAL SHEETS

22-Gage	Hat-Ralled	Cold-Reduced (Colled or Cut Length)			
F.a.b. Mill Cents Per Lb	(Cut Lengths)*	Semi- Processed	Fully Processed		
Field	8.025	8.225	*****		
Armatura	5.39	8.75	9.25		
Elect	9.10	9.35	9.85		
Meter	10.10	10.35	10.85		
Dynama	11.00	11.25	11.75		
Trans. 72	11.95	12.20	12.70		
Trans. 65	12,50	Grain (Oriented		
Trans. 58	13.00	Trans. 80	16.60		
Trans. 52	14.00	Trans. 73 17.1			

Producing points: Beach Bottom (W5); Brackenridge (A5); Granite City (G2); Indiana Harber (I5); Manaßeld (E2); Neuport, K_2 , (N5); Nilea, 0, (N5); Vandergrift (U1); Warren, 0, (R3); Zaneaville (A7), \sim Colla 786 higher.

CLAD STEEL

Stainless-carbon No. 304, 20 pct.	Plate	Sheet
Coatesville, Pa., L4		
Washington, Pa., J2		
Claymont, Del., C4 New Castle, Ind., 12	+1111	32.50
Nickel-carbon		
10 pct. Coatesville, Pa., L4	39,50	
Inconel-carbon 10 pct., Coatesville, Pa., L4	47.90	
Monel-carbon 10 pet. Coatesville, Pa., L4	40,80	

^{*} Includes annealing and pickling, sandblasting.

Base price, f.e.b. dellars per 100 lb., WARE-HOUSES Shoots Strip Plates Shape Barr Alley Bars Het-Relled A 4140 Ammerical Cald Ralls Hot-Rolled Het-Relled Cald-Dray A 4615 As relied Cold-Dra Calvania (10 gags) Dog of the last 6.02 7.51 7.78 6.69 6.37 6.72 6.68 8,52 6.35-6.50 7.23 7.35-8.16 8.23 8,25-9,00 9,42-9,52 8,80-8,84 8,30 6.60 9.60 6.65 6.65 6.50 Birmingham 15 8.66-8.70 7.85³ 7.90 7.25 12.60-12.80 12.50 7.34 Besten 19 1.47 9.65 7.49 7.20 12.60 15.15 15.25 6.35-6.48 6.38 6.76 6.75 6.62 6.65-6.70 6.52 6.56 6.55 6.51 7.40² 7.45 7.38 6.76-6.77 6.69 12.30 Buffalo........28 14.85 14,967 Chicago 28 12.25 12.05 14.60 14.78 6.48-6.53 6.38 8.25 8.30 8.25 6.84-6.91 6.72 6.81-6.86 6.69 6.75-6.80 6.57 Cincinnati......20 6.91 7.55 12,55 12.35 15.00 7,42 7.02 7.35 Cleveland30 11.96 12.11 14.76 8.15 9.15 10.37 6.48 8.10 8.15 8.30 9.27 16.30 8.56-8.56 9.93 6.85 7.35 7.54 6.57 7.57 6.90 7.16 6.79 12.45 12.35 14.80 14.90 7.70 7.60 7.70 9.50 13.10 7.18 8.07-8.27 7.45 10.15 12.27 Kansas City.... .28 7.05 8.65 8.95 7.29 7.19 7.36 7.85 7.45 7.65 13.35 Les Angeles 29 7.50 9.35 9.95 16.58 Memphis......10 6.79 7.69 6.98 7.01 7.60 6.88 8.24 8,21-8,39 9,23 6.61 Milwaukee28 6.47 7.47 6.71 6.86 6.60 7.44 12.34 12.14 14.69 14.79 8.76-10.76 8.63-8.73² 8.60 New Orleans... . 15 6.70 7.65 6.80 7.05 6.80 7.36-7.56 7.10 New York 10 7.18-7.27 7.10 12.63 12.43 15.08 8.46 7.38 7.37 Norfolk.......29 8.004 8.23 8.30-8.50 9.05 11.66-12.21 12.05 Philadelphia.....10 6.19 7.295 6.96 6.49 6.54 6.74 8,193 14.66 6.72-6.75 7.25 Pittaburgh 28 | 6.38 7.38 6.52 6.69 6.51 7.85 12.25 6.85 Pertland....... 20 7.00 7.75 7.05 19.20 7.76-6.85 7.50 7.70 Salt Lake City.. . 20 7.65 10.20 10.70 9.05 8.80 10.95 San Fenneisca. . 20 7.55 9.35-7.40 7.35 19.95 8.95 7.80 13.25 16.50 Seattle00 8.10 9.00 10.15 8.20 7.80 7.75 7.80 10.95 13.80 16.45 8.54-8.59 8.96 6.91 6.81 7.60 6.80 7.64 12.54 12.34 14.99 7.28 7.19 7.35 7.16 8.01 12.56 15.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanised sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanised sheets for quantity. Exceptions: (') 1500 to 9999 lb. (*) 1000 lb or over. (*) \$.25 delivery. (*) 1000 to 1999 lb, \$.35 delivery.

MERCHANT WIRE PRODUCTS

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	Standard & Costed Nails	Warea Wire Fonce 9-15/g gs.	"T" Fence Pests	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch, Wire Ann'ld	Merch. Wire* Galv.
F.o.b. Mill	Col	Col	Col	Col	ċ/fb.	¢/lb.	¢/lb.
Alahama City R3 Aliquipa, Pa. J3 Aliquipa, Pa. J3 Aliquipa, Pa. J3 Alianta A8 Bartonville K2 Bartonville K6 Chicago, III. N4 Cleveland A6 Cleveland A6 Cleveland A5 Crawforderille M4 Dunora, Pa. A5 Duloth A5 Fairfield, Aln. 72 Galvesteo D4 Houston : Johnstew , Pa. B3 Jolint, III. A5 Kokeme, Ind. C9 Las Ange on B2 Kantas (14) S2 Minney a C6 Mallon, III. R3 Pittaburg, Cal. C7 Partsmouth P7 Rarkin, Pa. A5	137 137 139 139 137 142 139 137 137 137 137 137 137 137 137 139	146 149 151 151 149 151 146 146 146 149 144 141 151 151 151	150	155 157 157 155 155 155 155 155 155 157 167	150 154 164 164 162 159 159 159 161 164 162 159 161	6,90 7,90 7,90 6,90 6,90 6,90 6,90 6,90 7,15 6,90 7,15 7,15 7,15 6,90 6,90	7.30 7.425 7.525 7.55 7.30 7.45
Se. Chicago R3. S. San Francisco C6. Sparrows Pt. R3. Struthers, O. V1. Worcester A5. Williamsport, Pa. S5.	136			187	164	7.00 6.90 7.20	7.55

Cut Nails, carleads, base \$8.30 per keg at Conshehocken, Pa. (A2).

*Alabama City and So. Chicago don't include sinc extra. Galvanised products computed with sinc at 11.0¢ per lb.

C-R SPRING STEEL

	CARBON CONTENT								
Cents Per Lb F.o.b. Mill		0.41- 0.60	0.61- 0.80	0.81- 1.05	1.06-				
ridgeport, New									
Britain, Conn. No				11.15	13.85				
luffalo, N. Y. R7	5.75			10.95	13.25				
arnegie, Pa. S9				11.15	13.85				
leveland A5	\$.75		9.00	11.15	13.85				
Detroit DI	5.85			10.95					
Detroit D2	5.85	8.25							
tarrison, N. J. CII			9.30	11.45	14.19				
ndianapolis C5	6.00		9.00	11.15	13.85				
iew Castle, Ps. B4	5.75	8.05	9.00	10.95					
lew Haven, Conn. DI	6.28	8.35	9.30	11.25					
awtucket, R. I. N7	6.30	8.35	9.30	11.45	14.15				
liverdale, Ill. Al		8.05	9.00	11.15	13.85				
haron, Pn. SI		8.05	9.00	11.15	13.85				
renten R4		8.35	9.30	11.25	13.46				
Wallingford W1	6.29			11.45	14.15				
Warron, Ohio T4	5.75	8.05		11.15	13.81				
Veirton, W. Va. W3	5.85	8.05	9.60	10.95	13.21				
Vorcester, Mass. A5				11.45	14.15				
oungstown C5				11.15	13.8				

BOILER TUBES

\$ per 100 ft, carlead lats, cut 10 to 24 ft. F.s.b. Mill	Si	se	Sean	dess	Elec. Weld			
	OD- In.	B.W.	H.R.	C.D.	H.R.	C.D		
Bahcuck & Wilcox	2 21/2 3 31/2 4	12 12 11	28.33 38.15 44.05 51.43 68.29	45,74 52,82 61,66	37.00 42.72 49.88	44.3 51.2 59.8		
National Tube	2 21/2 3 31/2 4	12	28.33 38.15 44.05 51.43 68.29	45.74 52.82 61.66	37.00 42.72 49.88			
Pittaburgh Steel	2 21/6 3 31/6 4	12 12 11	28.33 38.15 44.05 51.43 68.29	45.74 52.82 61.64				

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Miscellaneous Prices

(Effective Mar. 15, 1985)

TOOL STEEL

F.o.b.	mill				
W	Cr	V	Mo	Co	per Ib
18	4	1	-	-	\$1.54
18	4	1	-	5	2.245
1.8	4	2	-	*****	1.705
1.5	4	1.5	8		.90
6	4	2	6	-	1.29
High-	carbon	chromiu	m		405
Specia	al carbo	n	*****		37
Regu	lar carb	on		d east o	26
	pi are ssippi, 5			gher. W	rest of

CAST IRON WATER PIPE

	Fer A	et Ton
6 to 24-in., del'd Chicago	\$111.80 t	o \$115.30
6 to 24 in., del'd N. Y		
6 to 24-in., Birmingham	98.001	o 102.50
6-in, and larger f.o.b. car	rs, San	
Francisco, Los Angeles,	for all	
rail shipments; rail and	water	
shipments less	\$129.50 (o \$131.50
Class "A" and gas pip	e, \$5 ext	tra: 4-in.
pipe is \$5 a ton above 6-	-in.	

LAKE SUPERIOR ORES

			_	_	 			
								livered ve for
								sa Ton
Openhearth lu	imp .							\$11.25
Old range, be	sseme	P						10.40
Old range, no	nbesse	m	et	2				10.25
Mesabi, besser	mer							10.25
Mesabi, nonbe	sseme	p						10.10
High phospho	rus .							10.00

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa\$14.2	
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa \$16.	50 to \$17.00
Foundry, oven coke	
Buffalo, del'd	\$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b	24.00
Philadelphia, f.o.b	23.00
Swedeland, Pa., f.o.b.	23.00
Painesville, Ohio, f.o.b	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

0	HAPHITI	E	CARBON				
Diam. (In.)	Langth (In.)	Price	Diam. (in.)	Length (in.)	Price		
24	84	29.80	40	160, 116	8.95		
26	. 72	20.00	35	110	8.95		
12 to 18	72	20.50	30	110	8.96		
7 to 10	66	21.00	24	72 to 84	9.10		
	80	23.26	29	90	8.95		
4	40	28.00	17	72	9.10		
3	40	27.25	14	72	9.50		
21/9	30	28.00	10, 12	80	10.30		
2	24	43.50		80	10.58		

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

		SCORNE
	Less Case	C.
½ in. & smaller x 4 in. & shorter	2	22
1/2 in. & smaller x 6 in. & shorter	+3	18
9/16 in. & % in. x 6 in. & shorter	+4	17
% in. & larger x 6 in. & shorter All diam. longer than 6 in.	+6	15
1/2 in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than	+2	19
Plow bolts	23	23

Nuts, H.P., C.P., reg. & hvy. Base Discount, Case Discount or Keg

%" or smaller %" to 1%" inclusive 1%" to 1%" inclusive	55 58 60	64 66 67 1/2
C.P. Hex. regular &		64
Hot Galv. Nuts (all t	ypes)	
%" or smaller	38	50 52 1/2

Rivets		
1/2 in. &	larger	Base per 100 lb \$9.25 Pet Off List
7/16 in.	and smaller	37

Cap Screws		ount H.C. Heat
	Bright	Treated
New std. hex head, pack- aged		
%" x 6" and smaller and		
shorter	38	28
%". %", 1" x 6" and		
shorter	1.5	1
New std. hex head, bulk* 5" x 6" and smaller and		
shorter	5.0	42
34". 74". 1" x 6" and	-	
shorter	32	21
*Minimum quantity pe:	r item :	
15,000 pieces 1/4", 5/16",	%" dian	n.
	9/16", 1	" diam.
2,000 pieces %", %", 1"	diam.	

Machine Screws & Stove Bolts

			43.19.16 E
		Mach. Screws	Boltz
Packaged, pac Bulk, bulk list		33	43
	Quantity		
14 -in. [1	5,000- 99,999	1.7	59
diam. {10	0.000-199,999	2.5	63
	0,000 & over		67
	5,000- 49,999		59
	0,000- 99,999	25	63
	0,000 & over		67
All diam.	5,000- 49,999		59
	0,000- 99,999		63
	0,000 & over		67

Machine Screw & Stove Belt Nuts

		21010 0		
	Die	scount		
			Hex	Square
Packaged,		list	30	33
Bulk, bulk		ntity		
% -in.		99,999	15	1.7
diam. &	{100,000-		23	25
amaller	1200.000	& over	31	2.2

REFRACTORIES

Fire Clay Brick Car	rloads per 1000
Fire Cley Brick Car First quality, Ill., Ky., Md.,	Mo., Ohio, Pa.
CACCPU SMITHE, PR., MARIE	10.0010114.00
No. I Ohio	107,00
Sec. quanty, Pa., Md., Ky.,	Mo., Ill. 107.00
No. 2 Ohlo	98.00
Ground fire clay, net ton, be cept Salina, Pa., add \$1.	50) 17.00
Silica Brick	
Mt. Union, Pa, Ensley, Ale	\$120.00
Childs, Hays, Pa	125,00
Chicago District	120.00
Western Utah	
Super Duty	
Super Duty Hays, Pa., Athens, Tex.	. Wind-
DRID	137.00
Curtner, Calif	155.00
Silica cement, net ton, bull	k. East-
ern (except Hays, Pa.) .	20.00
Silica cement, net ton, bull	k, Hays,
Pa	22.00
Silica cement, net ton, bu	lk, Chi-
Silica cement, net ton, bu cago District, Ensley, A	ln 21.00
Silica cement, net ton, bul	k, Utah
and Calif	
Chrome Brick	Per net ton
Standard chemically bonder	d. Balt 386.00
Standards chemically bonds	d. Curt-
ner, Calif	96.25
Burned, Balt	
Magnesite Brick	
Standard Baltimore	\$109.00
Chemically bonded, Baltim	ore 97.50
Citetinenty bonded, Milling	
Grain Magnesite	t. %-in. grains
Domestic, f.o.b. Baltimore	
in bulk fines removed	
Domestic, f.o.b. Chewalah,	Wash.,
Luning, Nev.	
in bulk	
in sacks	43.75
Dead Burned Dolomite	Per net ton
F.o.b. bulk, producing po	ints in:
Pa., W. Va., Ohio	\$14.50
Midwest	15.10
Missouri Valley	13.65
	The state of the s

FLUORSPAR

																														111	
Pri	C	e,	ne	et	1	Ol	n	1	e	n	Ŕ	eC.	Ť.	f	80	è	1	3i	a.	B	Ų,	-	36	H	11	e	n	ŧ.			
721	6	%			ï				,												ī			,	×	,	. !	8	14	0,0	ð
700	6	OF	1	ne) F	6									A													4	12	.5	0
609	6	OI	- 1	es	86				4	4						4						0			0	0	,	3	18	.0)

METAL POWDERS

Per pound, f.o.b. shipping poilots, for minus 100 mesh.	int, in ton
Swedish sponge iron c.i.f.	
New York, ocean bags,	11.254
Canadian sponge iron,	
Del'd in East	12.0€
F.o.b. ship. pt., carloads	9.5¢
Domestic sponge fron, 98+%	
Fe, carload lots	9.5¢
Electrolytic iron, annealed,	
99.5 + % Fe	38.0€
Electrolytic iron, unannealed,	
minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced fron mi-	
nus 300 mesh, 98+% Fc63	0e to 80.0e
Carbonyl iron, size 5 to 10	
micron, 98%, 00.8+% Fe83	.0e to \$1.48
Aluminum	31.54
Brass, 10 ton lots29,56	
Copper, electrolytic	49.50€
Copper, reduced	49.504
Cadmium, 100-199 lb. 95¢ plus n	
Chromium, electrolytic, 99%	actual ration
min., and quality, del'd	\$3,60
Lead	23.504
Manganese	57.00
Molybdenum, 99%	\$2.75
Nickel, unannealed	89,504
Nickel, annealed	96,504
Nickel, spherical, unannealed	93,506
	43.504
Solder powder 7.0¢ to 9.0¢ plus	
Stainless steel, 302	91.00
	\$1.10
Stainless steel, 316	
Tin	\$4.05
Tunketen, 38% (63 mean)	
Zinc, 10 ton lots	.09 (0) 20.04

Ferroalloy Prices

Ferrechrome Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max 81, 0.25% C . 36.00 0.15% C . 33.75	Spiegeleisen Contract prices, per groes ton, lump, f.o.b. Palmerton, Pa. Manganese Silicon 16 to 19% 3% max	Ton lots 1	9.25¢ 10.15
6.925% C 38.00 0.15% C 33.75 6.925% C 32.50 20% C 32.50 Simplex 34.50 0.06% C 33.25 0.66% C 34.50 1.06% C 33.25 2.10% C 34.00 2.06% C 32.75	19 to 21% 3% max. 86.00 21 to 22% 3% max. 88.56 23 to 25% 3% max. 51.00		\$1.28
62-66 Cr, 4-6% C, 6.9% St 25.60	Manganese Metal Contract basis, 3 in. x down, cents per pound of metal, delivered.	Ferrocolumbium, 50-60%, 2 in. z D contract basis, delivered per pound contained Cb. Ton lots	12.00
S. M. Ferrockrome Contract prices, cents per pound, chromium contained, lump sise, delivered. High carbon type: 60.55% Cr, 4-6% 81, 4-6% Mn, 4-4% C.	95.50% min. Mn, 0.2% max. C, 1% max. S1, 2.5% max. Fe. Carload, packed 45.00 Ton lots 43.50	Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Cb plus Ta	\$6.25
Carloads 25.85 Ton lots 28.66 Less ton lots 29.50	F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O.,	Ferromolybdenum, \$5-75%, 200-1b containers, f.o.b. Langeloth,	\$1.46
High Nitrogen Ferrechrome Low-carbon type 67-72% Cr. 0.75% N. Add 5¢ per lib to regular low carbon ferrechrome price schedule. Add 3¢ for each additional 0.25% of N.	Gelivered, cents per pound.	Ferrophosphorus, electric, 23- 26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage,	90.00
Chromium Metal	motal vivianianianianianianianianianianianianiani	Ferrotitanium, 40% regular grade.	
Contract prices, per ib chromium con- tained, packed, delivered, ton lots, 97% min. Cr. 1% max. Fe.	Medium Carbon Ferromanganese Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloada, lump, bulk, delivered, per lb of contained Mn 21.35€		\$1.36
0.50% max. C	Low-Carb Ferromanganese Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%. Carloads Ton Lens		\$1.50 \$1.55
(Cr 34-41%, Bi 42-49%, C 0.05% max.) Contract price, carloade, f.o.b. Niagara Falle, freight allowed, lump 4-in. x down, 34.75¢ per ib contained Cr plus 13.00¢ per ib contained Bi. Bulk 2-in. x down,	0.000 (7. 0.000)	Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, car-	
ib contained Si. Bulk 1-in. x down, 35.256 per lb contained Cr plus 11.006 per lb	P. 30% Max. C. 28.95 28.80 35.65 0.07% max. C. 29.95 21.80 33.85 0.15% max. C. 28.45 30.30 31.50 0.30% max. C. 26.95 28.80 30.60 0.55% max. C. 26.45 28.30 29.50 0.75% max. C. 80-85% Mn, 5.0-7.0% 81 23.46 26.30 26.50	Ferrotungsten, ¼ x down, packed, per pound contained	\$3.80
contained St.	***	Melybdie exide, briquets, per lb contained Mo. f.o.b. Langeloth.	
Coltract price per lb of alloy, lump, delivered. 30-33% Cr, 50-65% Sl, 3.00 max. Fe. Carloads	Silicomanganese Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mo, 18-20% St, 1.5% max. C for 2% max. C, deduct 0.2¢.	bags, f.o.b. Washington, Pa.,	\$1.27 \$1.24
Ton lots	Carload bulk	Carload, bulk, lump 1	10.104
Contract prices, cents per lb of alloy, lump, delivered. 16-20% Ca. 14-18% Mn. 53-59% St.	Silvery Iron (electric furnace)	Vanadium Pentoxide, 86 - 89% V ₂ O ₅ contract basis, per pound contained V ₂ O ₅	\$128
Carloads 20.00 Ton lots 32.30 Less ton lots 23.30	Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$85.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falis, N. Y., \$88.00. Add \$1.00 per ton for each	Zirconium, contract basis, per lb of alloy. 35-40%, f.o.b. freight allowed, ton lots	26.004
SMZ Contract prices, cents per pound of allow, delivered, 60-65% 21, 5-7% Mn, 5-7% Zr, 20% Fe ½ ln. x 12 mesh. Ton lots	N. Y., \$88.00. Add \$1.00 per ton for each additional 0.50% St up to and including 17%. Add \$1.45 for each 0.50% Mn over 1%.	12-15%, del'd, lump, bulk- carloads	8.00
Leas ton lots 19.00	Silicon Metal Contract price, cents per pound con-	Beresil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B. 314%. Si.	** 01
V Foundry Alley Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% St,	tained Si, lump size, delivered, packed. Ton lots Carloads 56% Si, 2% Fe 20.10 18.00 97% Si, 1% Fe 20.60 18.50	40-45%, per lb contained 3 Beriam, f.o.b. Niagara Falls Ton lots, per pound Less ton lots, per pound	\$5.25 454 504
8-11% Mn, packed. Carload lots	Silicen Briquets Contract price, cents per pound of briqueta, bulk, delivered, 40% Si, 2 ib Si	Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, t.o.b. Suspension Bridge, N. Y.	
Graphidox No. 4	briquets, bulk, delivered, 40% 8i, 2 ib 8i briquets. Carloads, bulk	freight allowed. Ton lots per pound	
Cents per pound of alloy, f.o.b. Sus- pension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%. Carload packed 17.50	Electric Ferrosilicon Contract price, cents per ib contained	max. C, 1 in., x D, Ton lots F.o.b. Wash. Pa.; 100 lb up 10 to 14% B 14 to 19% B 19% min. B	\$1.20 1.20
Carload packed 17.50 Ton lots to carload packed 18.50 Less ton lots 20.00	Si, lump, bulk, carloads, delivered. 25% Si 20.00 75% Si 14.40 50% Si 12.00 85% Si 15.10 65% Si 13.50 90% Si 17.25	Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over	1.6
Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn; Cents	Calcium Metal Eastern zone contract prices, cents per	No. 1 No. 6 No. 79 Manganese - Boron, 75.00% Mn,	63
Producing Point Marietta, Ashtabula, O.; alloy, W. Va.; Sheffield, Ala.; Portland, Ore. 9.50	pound of metal, delivered. Cast Turnings Distilled Ton lots \$2.05	15-20% B, 5% max. Fe, 1.50% max. Sl, 3.00% max. C, 2 in. x D, del'd. Ton lots	81.4
Clairton, Pa. 9.50 Sheridan, Pa. 9.50 Philo, Ohio . 9.60 Add or subtract 0.1¢ for each 1 pct Mn	Ferrovonadium 25-55% contract, basis, delivered, per	Less ton lots Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 2.00% max. Fe, balance	1.5
above or below base content.	openhearth\$3.00-\$3.10	Ni, del'd, less ton lots	\$3.0



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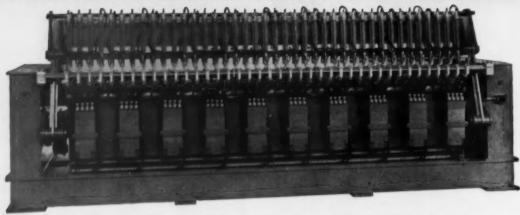
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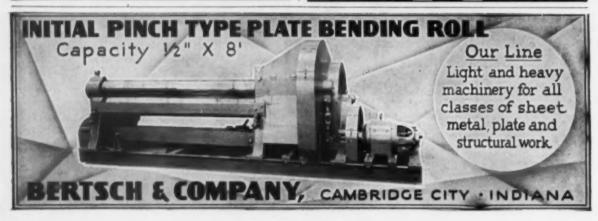
Model D-2

The Model D-2 Kardong Bender is a Four Direction Hortsontal Bender. With this bender it is not necessary to turn bars over to make reverse or second bende on beam bars. The Model D-2 is made in two sizes. Model D-2 Standard 6-inch, which will bend bars around cellars 2-inch to 6-inch and Model D-2 Special 8-inch, which will bend bars around cellars 2-inch to 8-inch, which will bend bars around cellars 2-inch to 8-inch. Capacity of both models, IV-inch Square Bars. The Model D-2 is a production bender for celinforcing that benders.

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PERFORATED. TO YOUR REQUIREMENTS SEND US YOUR DRAWING FOR PRICE PERFORATED METALS ALL SIZE AND SHAPE HOLES-ALL METALS ARCHITECTURAL GRILLES FOR ALL INDUSTRIAL USES DIAMOND MFG. CO. Box 41 Write for Catalog 39 WYOMING, PA.



How safe do you think this pickling chain is?

Look at every link in this chain.

Look for signs of weakness. Look for wear. For corrosion. For stretch. Look closely.

Looks brand new, doesn't it? Yet it has ten tough years of pickling behind it. Ten tough years lifting heavy ship plates, suspending them in hot sulfuric. You can see for yourself that these tough years rest lightly on this chain . . . that it is safe for many more years. Maybe ten. Maybe fifteen.

What makes this chain so safe?

Monel®. Monel is unique in its resistance to pickling acids. Particularly when handling irons or steels.

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There's no reason why you shouldn't have safe, longlife Monel pickling chains like this. Metal working plants all over the U. S. do. Your distributor of Monel can tell you where to get them.

What about Monel for other pickling jobs?

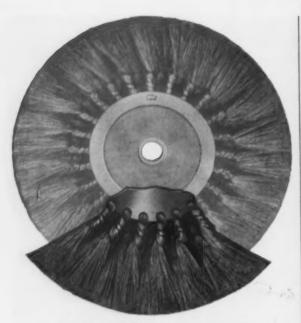


Monel has proved outstanding for many other types of pickling equipment besides chains. Tie rods, pickling hooks, baskets, for example. You can get the details in a new 32-page Inco booklet, "Equipping the Pickle House for Greater Production at Lower Cost." Write for a copy. It's packed with ideas.

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 - · Better cleaning
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Because of their construction, Pittsburgh "Lightning" knotted sections have exactly the same number of wires in every knot. As a result, you get a brush with perfect balance-one that will wear uniformly and cause less bearing-destroying vibration in the machine that

What's more, the special type of wire used in these knots is the fastest cutting, with the longest life, that can be produced. Built for the toughest applications, "Lightning" brushes are perfect for cleaning welds, removing scale or rubber, or cleaning parts where penetration brushing is needed.

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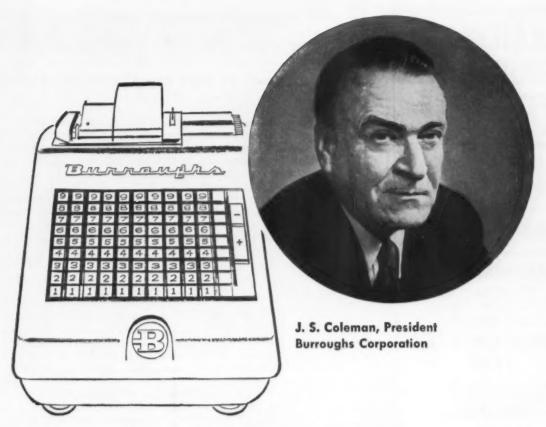


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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Plan Jamaican Mill... A group of Jamaican and American businessmen may open a small steel mill in Jamaica—providing the right types of used steelmaking equipment and technical assistance are available.

Working with the Industrial Development Corp., an agency of the Jamaican government, the syndicate intends to build a mill to remelt low cost local scrap, using bunker oil, and roll it into a limited number of shapes for use on the island.

R. S. Clarage, of the Industrial Development Corp., is actively seeking potential sellers of equipment. He wants technical assistance and is looking for youthful steel engineers to spend a year or so in this West Indian island getting the mill in operation.

Make Rods, Sheets . . . Specifically, the mill is to have a total annual capacity of 6500 tons. This will be divided into 3000 tons of reinforcing rods, 2500 tons of galvanized sheets, and 1000 tons of hot-rolled, pickled and oiled sheets. Furnaces are to be fired with bunker oil sp gr .88.

The equipment will be selected on the basis of low initial cost and simplicity, but should be driven electrically. In addition to the melting furnace, the mill will need all incidental melting equipment.

Use Small Ingots... For rolling, the equipment should be suitable for reducing small ingots to rods and sheets. All stands, rolls, drives, guides, shears and accessory equipment are required.

Finishing equipment includes a galvanizing pot and machine with accessory equipment; one cold-roll stand; one corrugator; shears; pickling equipment; and a small annealing box. Hand trucks, a crane, conveyors and miscellaneous equipment must also be purchased.

According to Mr. Clarage, ade-

quate capital has been committed and the cost and market outlook is favorable. His address is R. S. Clarage, P. O. Box 127, Montego Bay, B. W. I. 1

Army Will Rebuild . . . Machine tool rebuilding program of Army Ordnance appears to be taking shape as Rock Island Arsenal is planning to mail out a few bid forms this month. James Proctor of the Arsenal is addressing a board meeting of the Machinery Dealers National Assn. in Detroit today and will discuss program.

For some time Army Ordnance has been planning to rebuild a substantial number of their machine tools. Ordnance people believe they can get good value from such a move and met last summer with about 50 rebuilders to consider the program. At this Moline, Ill., meeting, machinery men inspected Ordnance tools.

Name Test Area . . . The program broke last fall. Chicago depot was named as testing area and it was reported contracts would be let soon after in other districts. At that time the Rock Island installation invited MDNA members to attend an inspection course designed to get across Army standards and avoid acceptance difficulties.

Standard contract forms for the program have been in the works several months and appear now to be almost ready. Awards will start slowly and a long range plan of activity is seen. As savings become evident it is expected similar programs will be established by other service branches.

Under fire at Feb. 17 MDNA meeting was the government method of making machine tools available to schools at a token charge. Abuses in the use and ultimate disposition of equipment under the last government surplus liquidation program were cited and steps to check evils were discussed.

THE CLEARING HOUSE

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" z 'y " Hertsen Initial Type Bending Roll
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5 ton PAH Trav-Lift	30° Span 220/3/46 A.C.
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6 ton Shepard-Nilies	40° Span 220/3/46 A.C.
10 ton Harnischfeger	50° Span 220/3/46 A.C.
15 ton Detr	45° Span 220/3/46 A.C.
15 ton Case	80° Span 230 Volt D.C.
With 230/3440 A.C. Generator	56t
With 25 ton Auxiliary	50° Span 230 Volt D.C.
With 5 ton Auxiliary	50° Span 230 Volt D.C.
50 ton Whiting	60° Span 230 Volt D.C.
50 ton Niles	60° Span 220 Volt D.C.
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#35 U S Multiclide Max. width of stock 414" by
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100 ton Southwark 4-Column, 14" Stroke Platen 18" x 24"

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PUNCH & SHEAR COMBINATIONS

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With Attachment for Dishing Heads

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22" x 58" Three High Breakdown Mill
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GESL** Leng & Allstatter Size B

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Pels DT-36-B Beam Shear, Capacity 2" to 15" Ibeams GRES, Angles, Belted Moter Drive

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3/16" Quickwork Rotary Shear, 36" Throat,

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N'S 3/16" Nisgars 88, Motor Dr.

10' x 3/16" Drois & Krump, Motor Driven

120' x 8, " Mingars 8810

120' x 8, " Ningars 8810

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SHEARS—MISCELLANEOUS

Bliss Upout Shear Capacity 44" wide x .061-197"

Complete with cold box, tables, etc.

Complete with cold box, tables, etc.

Birchine Sheet Mill Park Loar for side & end shear
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24" Stameo Foary Duty Blitter
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Ma. 5 James & Lamson rum type univ. turret (2) late.
4 5 James & Lamson rum type univ. turret (2) late.
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24" x 49" Monarch Toelroom, 1942.
No. 8 Glishoft, Fra-Sectotr, univ., new 1942.

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1-12 & 2-18 Cineinnati produstisn.
1-2-5-4-5-6 kame type plain & vertisal.
No. 38 Brewn & Sharpe, pl. heriz, 1942.
24° x 24° x 12° ingercolt adj., rall planer type, 1948.
42° x 42° x 19° ingercolt adj., planer type.
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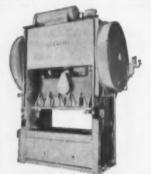
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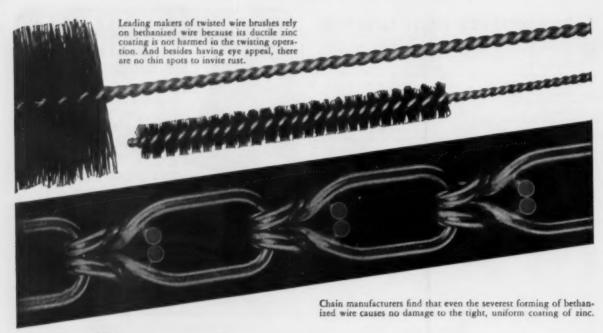


Here's the powerful husky Class K Hayward you see in so many mills and plants everywhere. You can't beat this popular bucket for handling turnings! And other scrap, too!

Write for details. The Hayward Company, 50 Church Street, New York 7, N. Y.

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What sets bethanized wire apart, above any other feature, is the perfect bond between the pure zinc coating and the steel base. As the wire goes through the bethanizing process, pure zinc is electrolytically deposited on the steel, atom by atom, building up a tight, uniform protective armor

That is why bethanized wire is hard to beat for corrosion-resistance. The zinc coating is so even that there are no thin spots where corrosion can find a foothold, and so ductile that it goes through severe forming and fabrication without damage.

The sparkle of pure zinc adds eye-appeal to wire products. Now is a good time to see what bethanized wire can do for you. Either light or heavy coating weights can be supplied in hard- or soft-temper wire. Our nearest sales office will give you complete information.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation



Here's an easy way to judge bethanized wire for yourself . . . let us mail you a small sample piece. You can twist it, bend it, wrap it around its own diameter—even draw it through dies—and the ductile zinc won't crack or peel off.

Write now for your sample. Address your request to Bethlehem Steel Co., Room 1037, Bethlehem, Pa. If you want enough bethanized wire for a production test, our Sales Department will gladly make arrangements to send you a trial order of the proper gage, temper, and coating weight.





See how easily the standard electric motor, the standard variable speed unit and the standard gear reduction combine into a drive that gives the RIGHT horsepower, the RIGHT shaft speed, the RIGHT features . . . all in one compact unit. Nowhere else will you find power units that are so flexible, so easily adaptable, and in such a wide range of types and ratings.

Master power drives are available in thousands and thousands of ratings (% to 400 HP)... in open, enclosed, splash proof, fan cooled, explosion proof... horizontal or vertical... for all phases, voltages and frequencies... in single speed, multi-speed and variable speed types... with or without flanges or other special features... with 5 types of gear reduction up to 430 to 1 ratio... with electric brakes... with fluid-drive... with mechanical or electronic variable speed units... and for every type of mounting... Master has them all and so can be completely impartial in helping you select the one best power drive for you.

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standard units easily combine into special purpose drives



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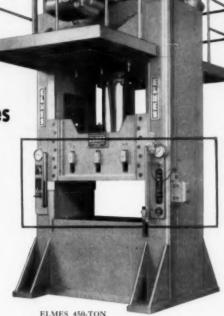
...are under your thumb!

with the sensitive, floor-level Control System on ELMES Presses

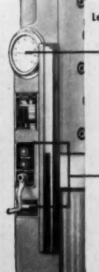
Elmes simplified controls—all at floor level—have made hydraulic press operation fast, accurate, instantly responsive. Operators of Elmes[®] Presses have confidence in the precise, unfailing control at their command.

Illustrated and described below is the Elmes control system for single-action presses. (Note especially those features which are exclusively Elmes.) These same controls, plus additional control features, are provided on Elmes double-action presses.

Elmes engineers have the long and specialized experience that is all-essential for helping you solve your metal-pressing problems to the *best* advantage. And they're ready to do so at all times. For recommendations and cost estimates, see your Elmes Distributor, or write to us direct.



SINGLE-ACTION DRAWING AND FORMING PRESS



Left-Hand Control Panel

Oil temperature signal and cut-out. Cutout is set to stop motor automatically if oil temperature should rise above recommended safe operating level.

Stroke control and speed change adjustments controlled from front of press (EXCLUSIVE). This feature permits operator to make adjustments while press is in action and to observe position of the ram while making adjustments.

Right-Hand Control Panel

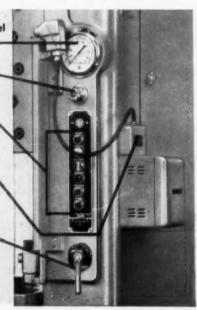
Pressure gauge.

Pressure reversal control.

Pushbuttons for starting, stopping, and reversing press, and selector switch for jog and semiautomatic operation.

Electric eye safety stop control (optional feature).

Manual, hydraulic bleed-off type inching control for die setting (EXCLU-SIVE). This feature permits control of slide movement to within a few thousandths of an inch.



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